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# The Farm

QUARTERLY SUMMER 1959 FIFTY CENTS

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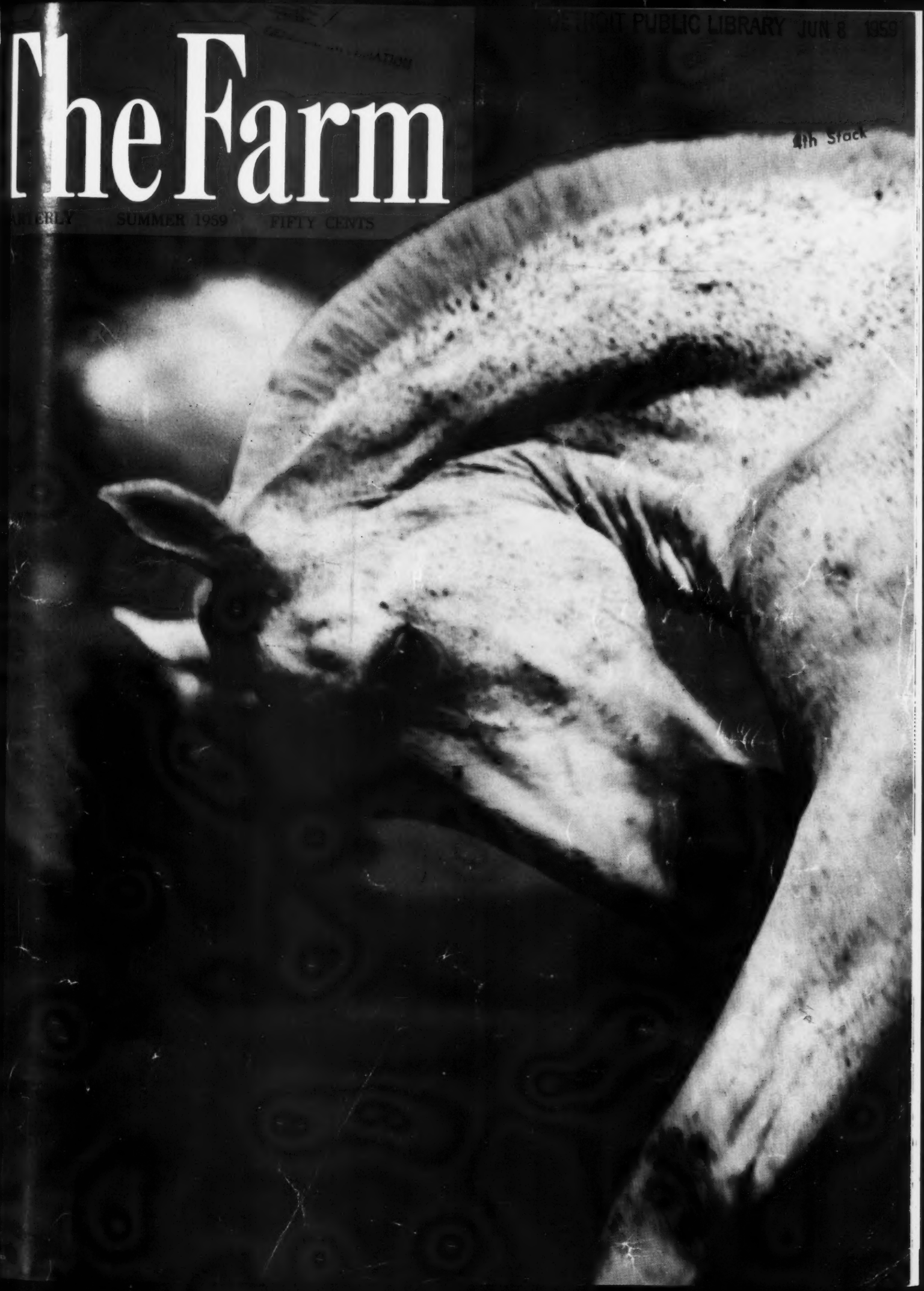


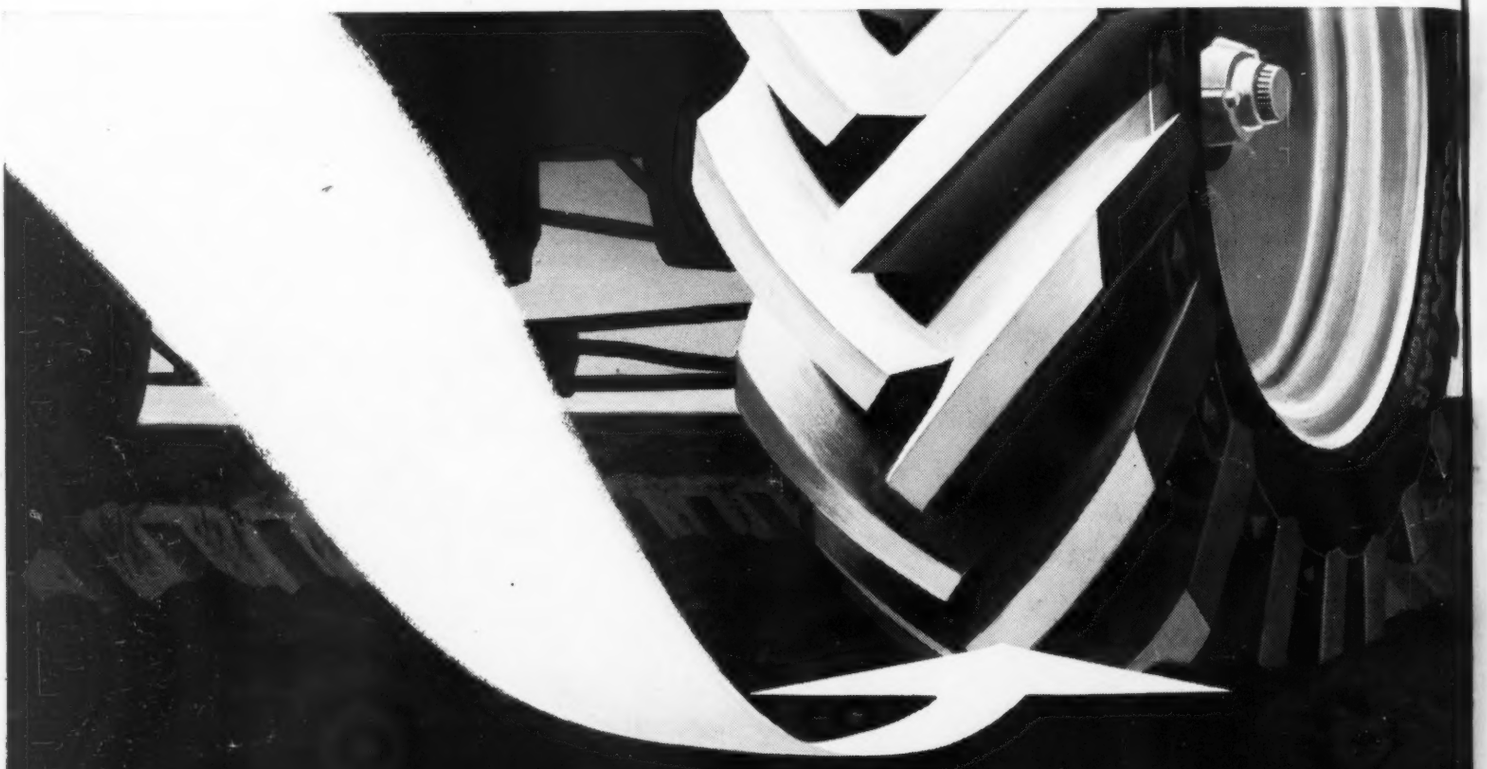
GOODYEAR TIRES

"They treat you fine at the Goodyear Sign!"

## Today's High-Powered Tractors Demand It!

# TRACTION SURE-GRI

## with "TORQUE CONTROL



## Delivers Traction-Action at the Point of Powe

Modern tractor power is on the upsurge. And so, too, is "torque"—the work-producing extra twist delivered to the drive wheels. To keep pace with these developments, you need tires of special design and unusual stamina.

That's just what you get with TRACTION SURE-GRIP – the tractor tire engineered especially for the stepped-up torque of today's farm machinery. It turns the *twist* of torque into *bonus* traction-action on the newest, most powerful tractors.

### And 3-T, too

TRACTION SURE-GRIP, extra-sinewed by Goodyear's exclusive 3-T Cord, is triple-tempered to be triple-tough and strong. It resists buckling, buckle breaks, cracking and rim slippage—withstands the furious pounding of rocks and snags and the extra strains at lug bases.

Along with Goodyear's famous tread design, *ruler-straight* lugs and *"Wedge-In"* action—you have a tire that capitalizes on all the power engineered into your high-torque tractor.

See the TRACTION SURE-GRIP with "Torque Control" on the very latest farm tractors —or call your nearest Goodyear dealer. Goodyear, Farm Tire Dept., Akron Ohio.

Tops in front tire performance

**NEW SUPER-RIB**

**3** ribs for better steering, better flotation, better wear!

FARM TIRES BY

# GOODYEAR

Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akr

MORE FARMERS PREFER GOODYEAR TRACTOR TIRES THAN ANY OTHER KIND!

H.R.

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JUN 9 1959

# 46 new models for farm use

from roomy pickups to rugged stakes and 4-wheel-drive units!

# 5 economy-proved "sixes"

plus 3 new optional V-8 engines . . .
all designed for truck loads, truck speeds, truck work!

# 31 new features

including new looks, new loadspace, new custom interiors, new all-weather driving comfort. Not forgetting traditional International values like safer vision, easier entry and exit and common-sense service accessibility!

**New stake or platform-body models** offer 4x2 or 4x4 drive, economical "six" or V-8 power.

**New Travelall®** takes loads that would swamp a "wagon"... or gives 8 passengers a roomier ride.

**New INTERNATIONAL pickups** are distinctively styled with dual headlights and one-piece anodized aluminum grille. Cab seat is over 5 ft. across. Big windshield has less corner distortion, no awkward doorway projections.

**New 7- or 8½-ft. Bonus-Load bodies** are flush with cab for extra loadspace. Center-controlled tailgate makes load handling easier. Standard pickup bodies also available. Truck-designed "six" or V-8 engines match your load and road requirements.

# THIS YEAR, ONLY INTERNATIONAL® TRUCKS ARE THIS NEW!

WORLD'S MOST COMPLETE LINE for any farm job!

International Harvester Co., Chicago
Motor Trucks • Crawler Tractors
Construction Equipment • McCormick®
Farm Equipment and Farmall® Tractors

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*Look, compare...you'll be a Massey-Ferguson man!*

# HORIZON SHRINKERS

## *They set an acre-eating pace no other combines can match!*

These are the world-famous Massey-Harris 92 Harvest Streamliners. And for big, horizon-shrinking capacity . . . for day-after-day, year-after-year dependability . . . they're the champs of the world.

These are the combines that are the choice of more custom operators than any other make. Here's why:

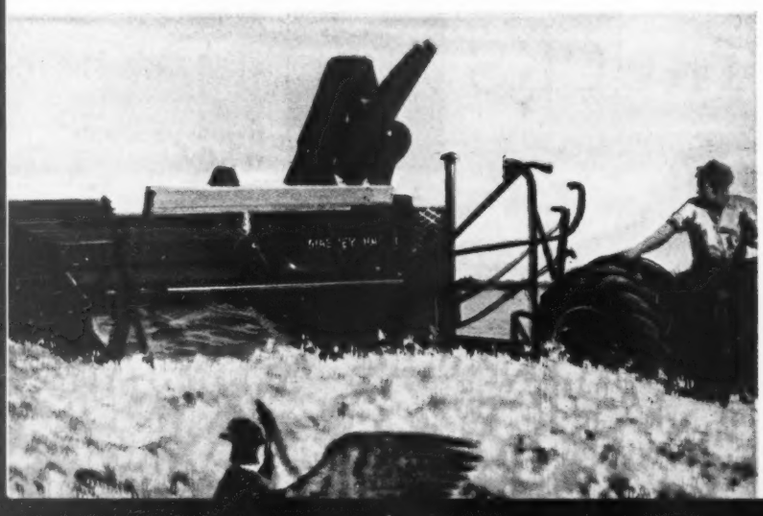
With their stepped-up power and threshing capacity, they work the fields faster, meet the challenge of even the heaviest stands.

Their exclusive Massey-Harris balanced separation and straight-through design get more of the grain, and get it cleaner.

Their low silhouette gives them a lower, safer center of gravity . . . makes them the easiest big combines to handle, transport and store. They make all other big combines look top-heavy!

The MH 92 and its slightly smaller "identical twin," the MH 82, were designed, tested and proven *in the field*. See one, work one . . . and you won't be satisfied with any other!

*Pull-Type MH 50 Clipper* has larger-than-average grain separation area. It gets more grain, cleaner grain, and gets it faster! In p.t.o. or engine drive, with hydraulic or hand table lift, 6 or 7 ft. table. Low-cost, economical.



*New MH 35 self-propelled,* shown below with corn head, is the lowest priced SP combine on the market! Compact yet complete, it has many Massey-Harris big combine features. The pull-type MH 35 is p.t.o. driven by any modern 3-plow tractor.

## *New fast-stepper for medium-sized farms!*

Whatever you combine . . . small grass seeds, grains, beans or corn . . . the new self-propelled Massey-Harris 72 gets *all* the crop! Its balanced separation and full-width, straight-through design provide the same speedy, crop-saving efficiency that has made Massey-Harris bigger combines' reputation in larger acreages. It has the famous Massey-Harris low silhouette for a lower, safer center of gravity, easier handling, transport and storage. It's *the* combine for medium-size farms!

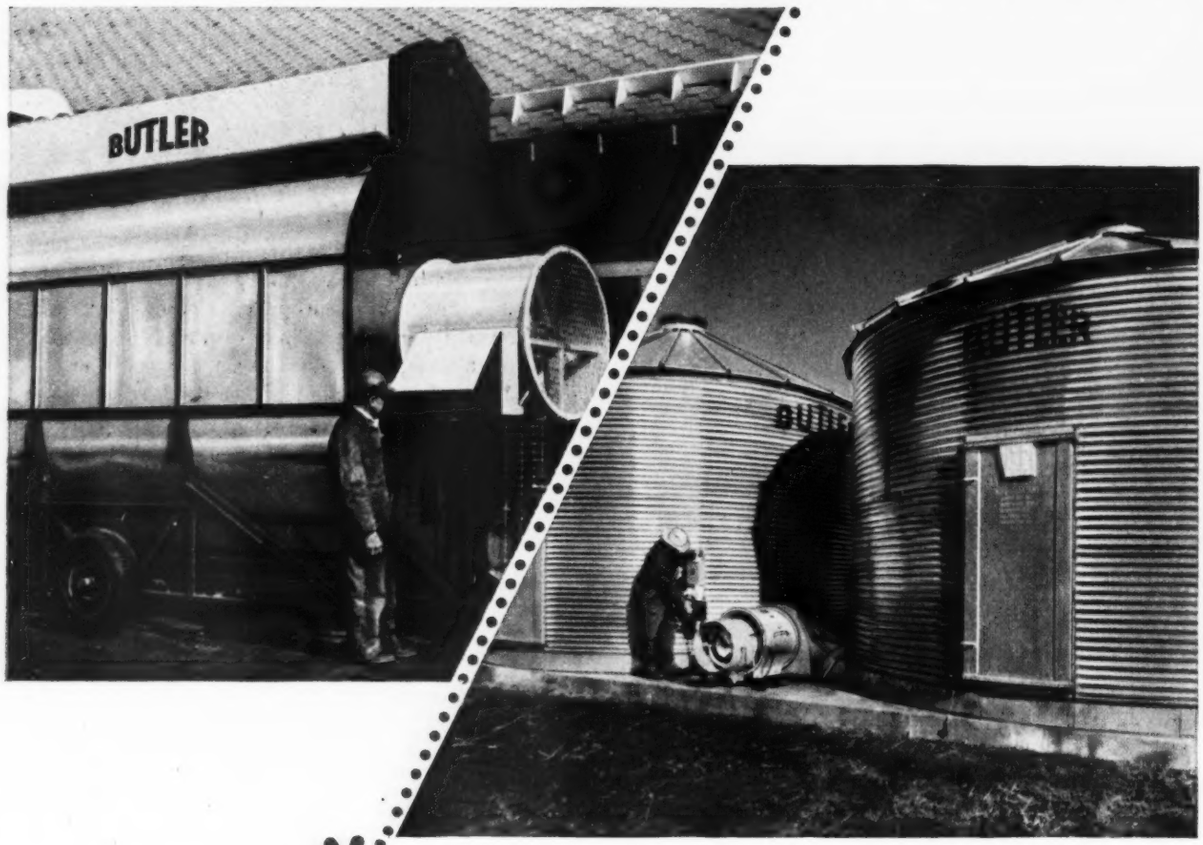
***New MH 72 Pull-Type Model*** (below) offers big-combine advantages at low cost for medium-size farms. This versatile, hard-working machine is available with grain head and bean kits. Low, compact, it is easy to transport and store. In p.t.o. or engine drive.

Now it's ***MASSEY FERGUSON***

**Massey-Ferguson Inc., Racine, Wisconsin**

*Pace-Setter of Modern Farming . . .*
*World's Most Famous Combines and the*
*Only Tractors with the Ferguson System*

# WHICH DRYING SYSTEM IS BEST FOR YOU?




## *Ask Butler, the company that makes both*

There is a man in your area who can help you make a wise, profitable decision about drying methods and equipment. He's your Butler Blue Ribbon Dealer. He's trained and backed by the company whose name appears on grain storage and drying structures all over the country–from on-farm grain bins to million-bushel elevators. This is the company with unequaled experience in grain drying. Millions of bushels have been dried with Butler equipment.

Butler makes a complete line of drying equipment ranging from a new feature-packed batch dryer to the famous STOR-N-DRY® bin drying system. With this complete line to choose from, your Blue Ribbon Dealer can recommend the type best suited to your farming operation.

This year, equip yourself to make a bonus on your grain – harvest wet grain early and get all of your crop, then dry it with Butler equipment. You can be sure you are buying the equipment that best fits your farming methods. Ask your Butler Blue Ribbon Dealer for his advice or write for our grain drying catalog.

**NEW BATCH DRYER**

Has more profit-making features than any other batch dryer on the market. Full 375-bushel capacity – garner bin that allows for grain shrinkage – high speed bucket elevator loads and unloads dryer in minutes. Automatic operation, thermostat temperature control – safety burner with automatic shut-off in case of power or flame failure. Perforated grain columns have 25% open area for easy air passage. PTO or electric drive models.

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*New Idea mounted picker with high capacity trailing husking unit fits most tractors.*

# You don't know your yield per acre until you pick with this New Idea

**Suddenly you're getting 2, 3 and 4 more bushels per acre.**

Because New Idea's new stalk guide reduces ear drop-off losses. Because New Idea's ground-hugging floating points don't ride over down and bent stalks. Because New Idea's low-reaching gathering chains pick up more down and tangled corn. Because New Idea's 2-level corn saver catches more loose kernels . . . stops waste.

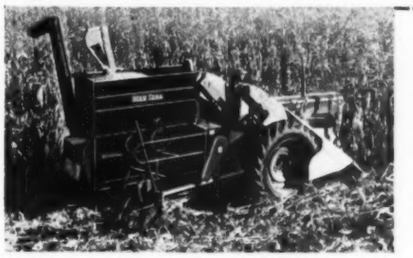
And look what's standard equipment on this New Idea mounted picker:

- Extra large capacity husking bed and wagon elevator
- Quiet operating clearing rolls
- High velocity fan for trash clean-out
- Banks of grease fittings for upper husking rolls
- Sturdy tractor wheel shields
- Convenient mounting ladder

New Idea gives you tractor-seat control of your four most important in-field adjustments: snapping roll spacing, height of snapping unit from ground, clutch to disengage wagon elevator, and load-leveling ear deflector. New Idea's trailing husking unit reduces weight on tractor wheels. You pick when others stick.

You expect more . . . you get more . . . when you buy a New Idea. See the New Idea mounted picker for 1959 at your New Idea dealer's now. Or write for free literature.

OUR 60th YEAR New Idea



**High-capacity New Idea Field Sheller** teams with mounted picker gathering unit . . . operates at normal picking speeds . . . delivers clean shelled corn into built-in, power unloading grain bin with leveling auger (as shown) or available without grain bin for loading into trailing wagon. Change from picking to shelling, or shelling to picking, in less than 30 minutes!

**New Idea** Farm Equipment Co. Division Avco Distributing Corp.

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- ☐ 2-Row Mounted Picker
- ☐ Field Sheller
- ☐ 2-Row Pull-Type Picker
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- ☐ 2-Row Mounted Snapper
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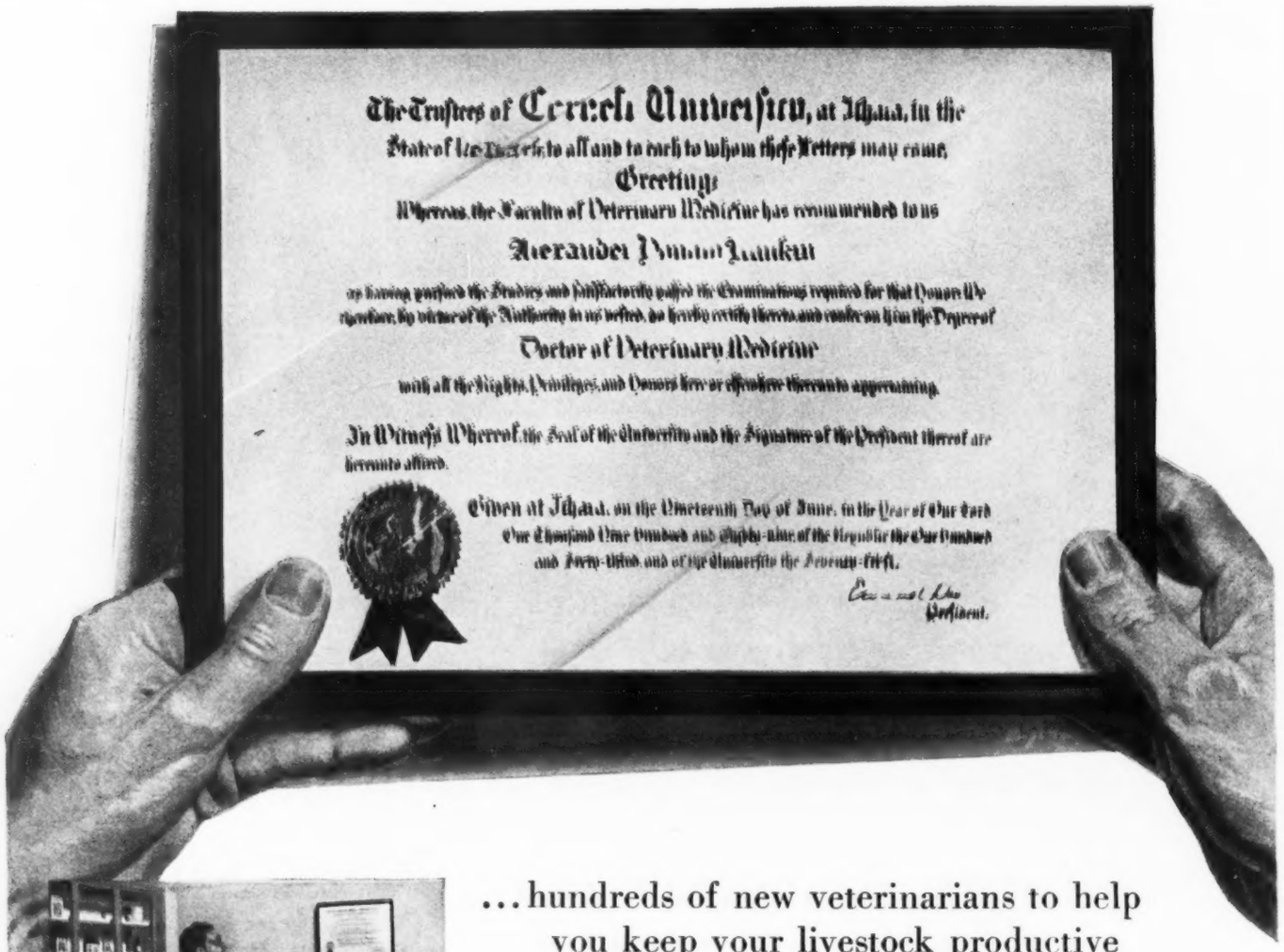
# Every year hundreds of new diplomas go up


The Trustees of Cornell University, at Ithaca, in the
Greeting:
Whereas, the Faculty of Veterinary Medicine has recommended to us
Alexander Duncan Lamkin
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**YOUR VETERINARIAN SPENDS ENDLESS HOURS IN STUDY**... he devotes much time to reading his professional journals, to meetings of veterinary associations, symposiums and scientific gatherings. By keeping abreast of veterinary progress, by offering you the full benefit of the latest techniques and newest drugs, he helps you keep your animals producing at the peak of their productivity and profit.

## ...hundreds of new veterinarians to help you keep your livestock productive and profitable, your pets healthy.

PROUDLY FRAMED AND PROUDLY DISPLAYED, the graduate veterinarian's diploma is the reward of years of study, the sign of a job well done. Even more important, it signifies the start of a *new* job . . . the all-important job of helping you keep your livestock productive and profitable, your pets healthy and vigorous.

It's a great day for the new veterinarian—the day he begins his professional practice. And for his community, this man and his diploma mean that expert training and skill are on call when and where they're needed.

The new veterinarian, like the veterinarians already established in practice, is a specialist in livestock health. Through his all-embracing program of Animal Health Engineering, he brings to your farm or ranch the most recent advances in the science of breeding and raising animals for profit. He's rigorously schooled in the techniques of disease prevention, diagnosis and treatment. He's a skilled surgeon. He's a good friend and neighbor.

Trust your veterinarian to care for your animals as scrupulously as he would his own. When he administers a drug, trust him to choose the finest for the purpose and to administer it properly.

Often he may choose a drug bearing the Squibb label. When he does, trust Squibb to market drugs only of the highest purity, safety, potency and efficacy. Remember the words which have stood behind every Squibb product for more than 100 years: SQUIBB—A NAME YOU CAN TRUST.

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# JOHN DEERE COMBINES...

# *BIG CAPACITY Made Them Famous*

# *LONG LIFE Keeps Them That Way*

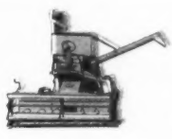
The 8-, 10-, or 12-foot 45 with two-row corn attachment.

**There are 4 big-capacity John Deere Combines . . . *Sizes from 7 to 18 feet***

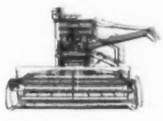
BIGGER daily work output with a John Deere Combine is possible because every operating unit is big enough to handle its share of the load —efficient enough to do good work in the heaviest crops. These units move all material smoothly and evenly, thresh out a maximum of the kernels, give complete separation and cleaning. Long life of John Deere combines is insured by high-grade sealed bearings at *every* major wearing point—by slip clutches to protect *every* important drive—by traditional John Deere quality in their design and construction.

Get complete details on the combine that fits your exact needs from your John Deere dealer. He has four combines from which to choose, ranging in sizes from 7 to 18 feet.

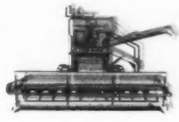
7-foot 30 Pull-Type Combine.



8-, 10-, or 12-foot 45 Self-Propelled.



12- or 14-foot 55 Self-Propelled.



14-, 16-, or 18-foot 95 Self-Propelled.

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Lester Nance with three litters of 37 pigs sired by Indiana's first certified meat boar.

INDIANA'S FIRST CERTIFIED MEAT SIRE PROVES

# Wayne Feeds and Good Breeding Top Combination For Pork Profits

A registered Yorkshire boar, owned by Lester Nance and Family, Arcadia, Ind., and Regal Foods, Windfall, Ind., has been named Indiana's **first certified meat sire,** any breed, at the Indiana Swine Evaluation Testing Station at Purdue University.

This record met rigid requirements on litters for rate of gain, feed conversion and carcass quality, proving the value of good breeding and good feeding. Lester Nance says: "Only pigs that have been started right and in excellent condition could have made such an outstanding record at Purdue Testing Station. Wayne Feeds and feed efficiency breeding make a profitable hog producing program."

Boar, sows and pigs were fed on the Wayne Life Cycle Hog feeding program. It's working for Lester Nance and hundreds of other hog raisers . . . and can work for you! Bigger, stronger litters, faster more economical gains, and better carcass quality add up to profitable pork production for you . . . get it with Wayne.

*Look at the record of this outstanding boar:*

**First boar of any breed to sire five certified litters; Two litters with feed conversion of 2.96 and 2.99; Ten litters with lowest average feed conversion, 3.10; Sired fastest gaining pig, 200 lbs. at 128 days; Litter with lowest average back-fat, 1.18 inches; Litter with highest yield in 4 lean cuts, 59.43%.**

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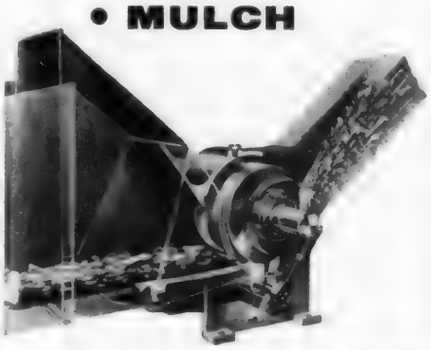
# FITCHBURG CHIPPER
## MAKES LOW-COST

- **BEDDING**
- **LITTER**
- **MULCH**



Take the hard work out of hauling brush with a Fitchburg Farm Chipper! Easy-to-load, handle and haul wood chips, used as manure or mulch, make brush removal profitable. A FITCHBURG FARM CHIPPER WILL WORK WONDERS FOR YOUR FARM...

**...IN ORCHARDS:**
Tree trimmings need no longer be hauled! Brush, fed into your Fitchburg Farm Chipper will blow chips around trees for moisture-holding mulch. Chips can be worked into the ground with cover crops or left for weed control.

**...IN DAIRY BARNS AND POULTRY HOUSES:**
Tough absorbent wood chips really stand up in dairy barns and poultry houses. Your Fitchburg Farm Chipper will cut poultry production costs—reduce dairy barn straw requirements by producing litter and bedding from your wood lot.

**...IN POUND YARDS:**
Wood chip bedding stands up better in wet spots—cakes less for faster loading, easier spreading, yet holds up longer near gates and water troughs. Absorbent wood chips carry plant nutrients to crop land—supply crops with humus that lasts. Seed beds crust less for better germination—tight ground holds moisture better—stays open longer.

**YOUR BEST BUY IS A FITCHBURG FARM CHIPPER:**
It's engineered for rugged, all-day service! Normal lubrication, with periodic sharpening of the tough chrome steel blades, keeps the Chipper on the go. The Safety Spring-Activated Feed Plate adjusts itself instantly to different size wood—gives safe, smooth chipping. The economy and speed of operation will soon return the Fitchburg Chipper's price of $650 for the mulch Chipper; $960 for the bedding Chipper.

**...ONE YEAR GUARANTEE:**

**FREE** WRITE TODAY FOR MONEY SAVING FOLDER!

FITCHBURG ENGINEERING CORPORATION
Fitchburg, Massachusetts, Dept. FQ-69

Send my free copy of "How To Make Low-Cost Bedding-Litter-Mulch" to:

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We have (Make and Model) Tractor



# The Farm QUARTERLY

*Summer, 1959, Volume 14, No. 2*


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*THE FARM QUARTERLY*
*22 East Twelfth Street, Cincinnati 10, Ohio*



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# "Before I pay for a new truck, IT HAS TO ROLL ON FIRESTONES!"

*says Joseph Penuel, Milford, Delaware. "I always specify Firestones on my new trucks —and for replacements, too. They wear far longer than any other make I've tried, and they take a lot more retreads. And I can count on good service and fast deliveries from my Firestone representative Calvin White of Buchanan Service in Milford."*

Farmers all over the country are finding Firestone truck tires save them money! It's only natural, too, because they're built with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires! With Firestone S/F (Shock-Fortified) cord, they stand up to the hardest knocks farm tires have to take! And there's a Firestone tire for every farm truck from half-ton pickups to heavyweight haulers. If you want extra low-cost mileage for farm to market runs, buy the Firestone famous Transport tire. For positive traction in muddy feed lots, on slippery roads or in soft fields, economical Firestone All Traction or Super All Traction tires are your best buy.

See your Firestone Dealer or Store and find out how Firestone truck tires give you extra service at no extra cost! See the complete line of Firestone tractor and implement tires, too. And remember, the Firestone Free New Tractor Tire Loaner Service keeps your tractors working while your Firestone Dealer or Store retreads or repairs your old tractor tires.

**Firestone**

***BETTER RUBBER FROM START TO FINISH***

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# The proof is "in the bag"

## *Model 90 saves owner 36.9 bonus bushels worth $73.80 extra*

Here's real harvesting NEWS!

During the 1958 soybean harvest, two combines, both late PTO models of similar size, each harvesting two rows at a time—were checked for bushels combined, time required and fuel used.

One was a Model 90 ALL-CROP Harvester; the other, a competitive make. Both were owned by experienced farmers. Working side by side in the same field, each harvested a measured 18 acres, exchanging lands halfway through the test to equalize any difference in yield of soybeans.

**Here are the results:**

The Allis-Chalmers Model 90...

... saved 36.9 more bushels of beans from its 18 acres. (Pictured above).

... finished in 5 hours, 48 minutes —1 hour and 37 minutes sooner— a full 20 percent less time.

... was powered by an Allis-Chalmers D-14 Tractor which used 2½ *less* gallons of fuel than the competing tractor.

Here is *field proof* ... why Allis-Chalmers is a great and trusted name in harvesting! Rubber shelling surfaces, *wide-flow* threshing capacity, clean air blast separation—all three—make the big difference. Bag *extra* profits—see your Allis-Chalmers dealer now.

CORN, TOO! New corn head attachment is available—quickly converts Allis-Chalmers combines for field shelling.

(Below) Aerial photo of field where bean test was run. Light strips are harvested areas.

ALL-CROP, is an Allis-Chalmers trademark.

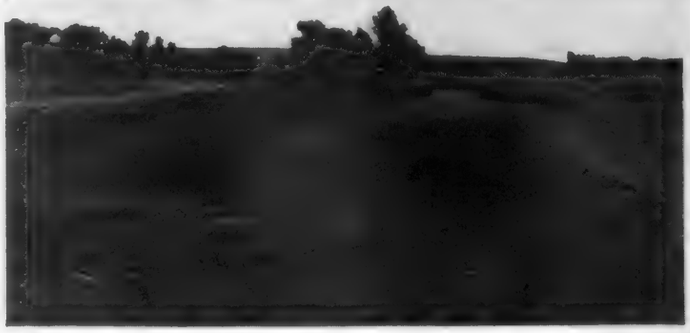
***Ask your dealer about the Allis-Chalmers plan to finance your time purchase of farm equipment!***

ALLIS-CHALMERS, FARM EQUIPMENT DIVISION, MILWAUKEE 1, WISCONSIN

**ALLIS-CHALMERS**

**LISTEN!** *Farm news, markets, music! "National Farm and Home Hour"—NBC radio*

# How cost-conscious farmers can solve critical problems:



Water runs unchecked down the rows, cutting gullies that can't be farmed across—destroying valuable topsoil, limiting equipment and good land use.

**EROSION**

Cat track-type Tractors help solve the problem by building check and water impounding dams, parallel terraces, and sloping and filling in the gullies.

Water stands on the field, drowning out crops, delaying planting or harvest, wasting valuable cropland and making farming difficult.

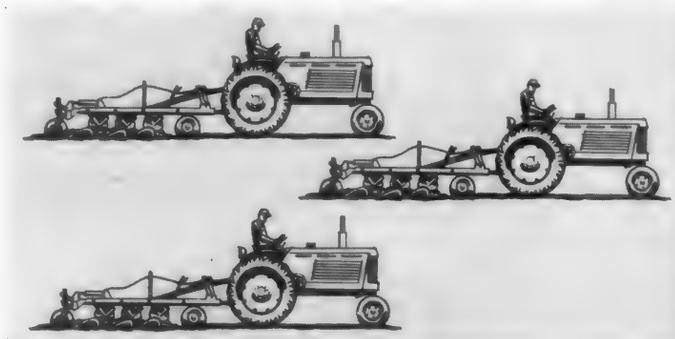
**DRAINAGE**

Caterpillar-built earthmovers cut off high spots and fill in low places to encourage proper drainage. They can also subsoil deep to shatter hardpan.

Almost every farm has some wasteland—hedgerows, scrub pasture, rocks, hillsides that should be improved for good pasture or cropland.

**WASTELAND**

Cat Diesel Tractors have the power, traction and ruggedness necessary for efficiently clearing wasteland. A variety of clearing equipment is available.



As farms get bigger, labor and equipment problems often grow, too. More machines and more help mean more supervision, higher costs.

**LABOR COSTS**

One man and a Cat Diesel Tractor can take the place of several men and ordinary farm tractors. *Final costs* are lower, and the work is done better.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Have your Caterpillar Dealer analyze your power needs—no obligation. Caterpillar Tractor Co., Peoria, Ill., U.S.A.

# Destination Anywhere...

## ...and PIPER puts you there with speed, style and safety

Wherever you're heading — to town for shopping . . . back to school with the youngsters . . . a state or two away to an auction . . . to far away holiday places — you'll get there easily, safely . . . with surprising economy . . . in your Piper.

From sturdy utility two-seater Super Cub to luxurious twin-engine Apache, the Piper line fills every type of farm and ranch requirement.

Consider the sleek, three-mile-a-minute Comanche flown by this carefree farm family. Styled like a jet, but as easy to fly as a Cub, the Comanche takes off in only 250 yards. Its rugged retractable tricycle landing gear makes any flat strip a proper runway. Like the Piper Tri-Pacer and Apache, the Comanche can now be ordered with Piper AutoControl, the sensational new automatic flight device that is the last word in flying ease.

Flying farmers and ranchers the world over are doing business more profitably . . . extending their pleasure horizons . . . in super-reliable planes built by Piper. The complete new line of Piper planes includes many advanced features that will interest you—whether you already own an airplane or have yet to discover the advantages a plane will offer you.

**Why not send today for details of these Piper planes?**

## THERE'S A PIPER PLANE FOR EVERY FARM AND RANCH PURPOSE

**SUPER CUB.** Workhorse for farm and ranch chores. Takes off, lands in 50 yards. Carries two in tandem seats, cruises 110 mph. PA-18-A agricultural model is world's most widely used plane for dusting, spraying.

**TRI-PACER.** World's most popular four-passenger plane. Combines most features to simplify flying. Cruises over 130 mph, has range over 500 miles, can carry 600 lbs. of freight. Ideal as farm plane.

**COMANCHE.** New, high-performance, roomy, four-passenger, all metal plane with retractable tricycle landing gear and many advanced aerodynamic features. Available with 180 or 250 horsepower.

**APACHE.** Most widely purchased twin-engine plane. Carries 4 or 5 passengers over 170 mph in roomy luxury. Provides safe, dependable night and day transportation. Has excellent short field and single engine performance.

### YOUR "BUILT-IN" AIRPORT

Your Piper is just as convenient as your car, since any level pasture or strip — 100 to 200 feet wide, 1,500 to 2,000 feet long with clear approaches — provides adequate landing facilities.

### LEARNING TO FLY IS EASY

You'll find learning to fly easy, whether you take individual lessons from your Piper dealer by the hour or follow Piper's "Learn as You Travel" program. Your Piper dealer will teach you to fly FREE in your own Piper.

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**Lock Haven, Pennsylvania**

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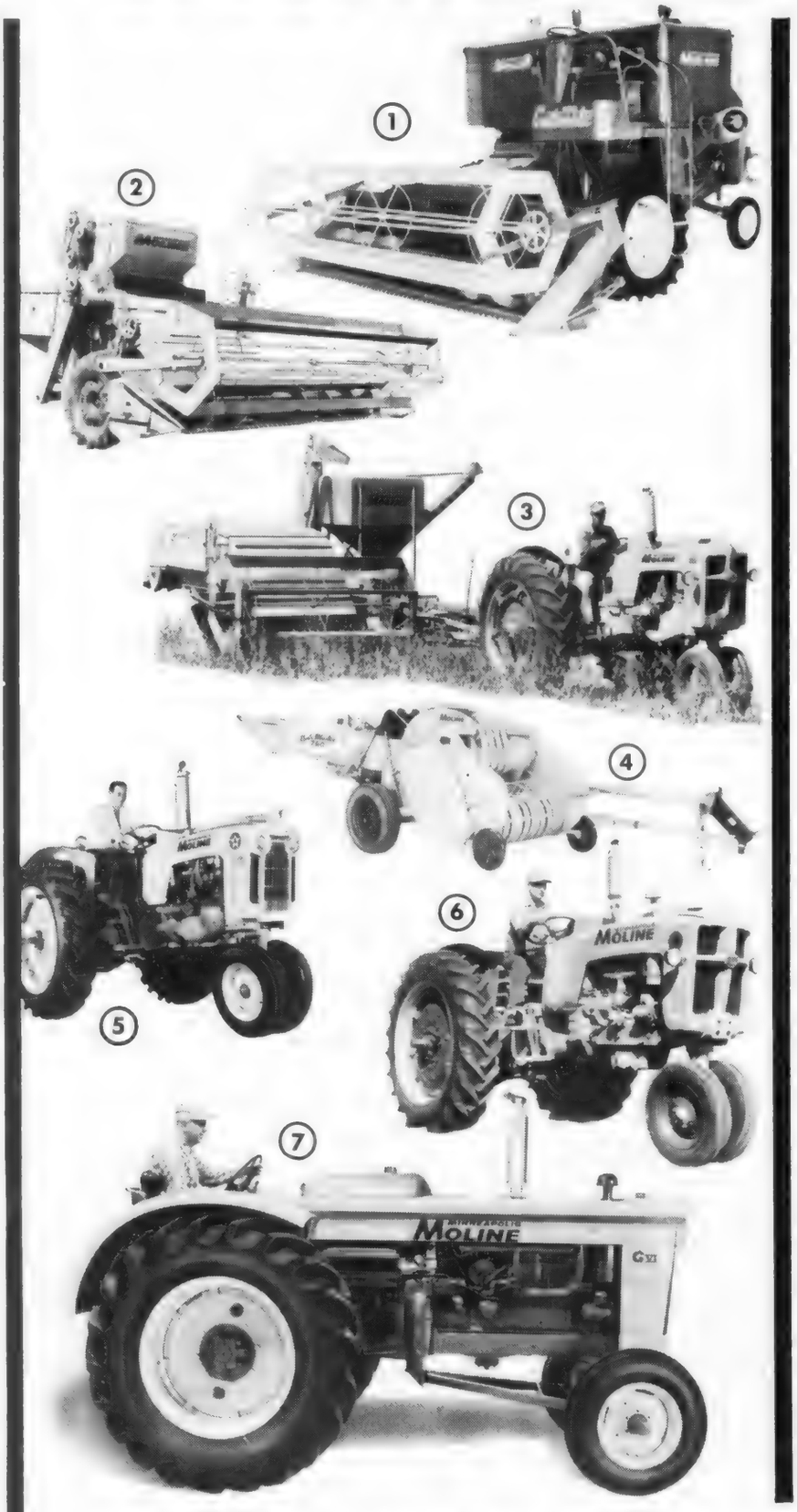
**MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORL**

# 7 Great MOLINE Machines




The 7 great Minneapolis-Moline machines shown here—5 of them *brand new*—are just a few from the complete MOLINE family of fine farm machinery. It will pay you to study them carefully . . . pay you even more to visit your Minneapolis-Moline dealer now and get the full facts about the farm equipment you need. See your dealer today . . . find out for yourself why wise farmers from coast to coast . . . from Mexico to Canada are switching to the NEW MOLINE.

### 1. NEW Customatic 570

New 14′ self-propelled, low-profile combine harvests 70 acres a day. Low 9′ 6¾″ height and power-adjusted wheels fit truck bed for easy transport. New hydraulic system with hydraulic-boosted variable ground drive, power steering, hydraulic control of header. Folding high-speed auger. *Push-button "one-shot" lubrication.*

### 2. NEW 120 Uni-Combine

New self-propelled, high capacity, 9′ 5″ low profile. Variable-speed drive "matches combine to crop." Hydraulic power for steering, raising and lowering header and header reel. New 45-bu. grain tank. Folding high-speed auger. 10 or 12-ft. direct-cut header, or 8-ft. pick-up.

### 3. FAMOUS "88" Harvestor

The Moline "88" is the one-man combine with the 88″ bite. Harvests in one straight-thru operation. PTO or engine drive. Easily handled by Moline 445 tractor . . . SEE YOUR MOLINE DEALER FOR BIG CASH SAVING DURING 445 BARGAIN SALE NOW ON.

### 4. NEW Bale Master 760

Exclusive Moline "in line" Bale Master 760 . . . *7 bales in 60 seconds!* Self-propelled or PTO. Exclusive Moline "straight-thru" bale-fold preserves high-protein leaves and blossoms in firmly twine-tied, uniform bales. Saves time and improves quality of your hay.

### 5. NEW 4-Star Super Tractor

Sparkling new De Luxe tractor powered by famous Moline-designed, Moline-built tractor engine in 45-50 hp class. Genuine 10-speed Ampli-Torc, automatic hydraulics. 3-pt. hitch, power steering, power-adjusted wheels, independent PTO. De Luxe "Float-Ride" seat, crown fenders, 4 headlights. NEW *2-tone color.*

### 6. FAMOUS 5-Star Tractor

BIG power to speed up heavy-duty operations . . . plus fuel economy and easy handling. Power steering, power-adjusted wheels, Ampli-Torc, independent PTO, 50-60 hp class. All fuels—4 front ends.

### 7. NEW G VI Tractor

*World's most powerful* tractor in its class. Over 80 belt hp . . . 72 drawbar hp on LP gas; over 75 belt hp . . . 67 drawbar hp on diesel. Unfailing traction with heavy implements. De Luxe seat. Full crown fenders, high operator platform. Full-access, heavy-duty swinging drawbar. New hydraulics. *More work with larger implements in less time for greater profit!*

***See them all at your Moline Dealer's now!***

**MINNEAPOLIS MOLINE** ...makes the NEWS in modern power farming!

# LIFE-TIME GATES

## . . . made with strong, lightweight, rustfree Reynolds Aluminum provide maximum service with low maintenance

Life-Time Gates are well named. Made by the Life-Time Gate Company, Houston, Texas, using Reynolds Aluminum, Life-Time Gates really last a lifetime! No other material does the job so well over such a long period of time. Gates made of other materials rot, splinter, weaken with age—weather poorly unless painted. Only aluminum provides a lifetime of service with a minimum of upkeep.

And aluminum is strong! A 12 foot Life-Time Aluminum Gate can support the weight of an automobile, so it's strong enough for the huskiest livestock. Yet this very same gate weighs just 49 pounds—about one-half as much as steel! Thanks to *really* strong Reynolds Aluminum and quality engineering, Life-Time Gates last years and years longer than ordinary farm gates, protect and keep cattle enclosed where you want them.

Look for Life-Time Gates made with quality aluminum, Reynolds Aluminum. For additional information, write *Reynolds Metals Company, P.O. Box 2346-SJ, Richmond 18, Virginia.*

Reynolds Aluminum gives added strength and life to Life-Time truck sideboards. They won't rot, splinter or weaken with age.

Life-Time pen sections are easy to clean, easy to put up and take down, thanks to Reynolds Aluminum.

Watch Reynolds TV show—
**"WALT DISNEY PRESENTS"**
—every week on **ABC-TV**

# "With Eaton 2-Speed Axles, WE HAUL MORE IN LESS TIME"

**says Pat Iribarren, Cunningham Sheep Co., Pendleton, Oregon**

"It takes all types of hauling to operate 125,000 acres of sheep range and grain fields," says Mr. Iribarren. "To give our trucks the flexibility required to keep down operating costs, both on rough sheep trails in the mountains and on fast runs over good highways, is why we specify Eaton 2-Speed Axles on our GMC trucks. Eaton's low-gear range gives us the pulling power required to gently transport lambs and sheep over rough places without injury. And the high-gear range helps us maintain highway speeds with lower, more efficient engine RPM."

You can get these benefits in the next truck you buy. Ask your truck dealer for a demonstration of the Eaton 2-Speed Axle.

**"TENDER LAMBS** require gentle handling to bring top market prices. That's what the Eaton 2-Speed enables us to give them—or anything else we haul," adds Mr. Iribarren. "With the Eaton we can maintain momentum, even on steep mountain roads, so that our loads are not jolted. And what's more, we've cut 15 percent off our gasoline bill."

**GMC TRUCK DEALER** B. L. Childress, Pendleton, Oregon, says: "I definitely recommend the Eaton 2-Speed Axle to farmers. The fact that Eaton users keep insisting on the Eaton 2-Speed every time they buy a truck proves they're satisfied. A truck with an Eaton 2-Speed not only gives better, longer service; it also brings a higher trade-in allowance."

**EATON** 2-SPEED TRUCK AXLES

MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY • **EATON MANUFACTURING COMPANY, CLEVELAND, OHIO**

## IS THERE A DAFFIN IN YOUR AREA?

The Daffin comes to your farm on a regular schedule . . . backs up to the barn . . . grinds, mixes, blends molasses with your own ingredients to make all your formula feeds . . . and you save money!

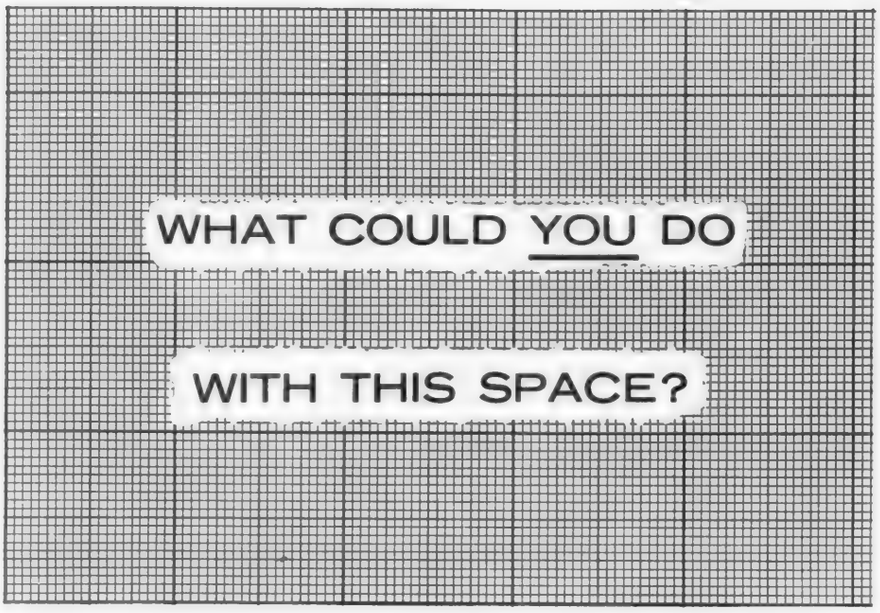
**FREE—Booklet tells how easy it can be for you to get into this profitable, new, independent business. Write Daffin Mfg. Co., 3902 N. Prince St., Lancaster, Pa., USA**

**Daffin** MODERN FEED MILLING EQUIPMENT

CONVENIENCE • • • ECONOMY • • • QUALITY

### PLAN TODAY FOR A PROSPEROUS TOMORROW!

Daffin Feedmobiles have proved highly successful for both their owner-operators and farmer-customers. The profit-making ability of a Daffin offers you an excellent business-building opportunity! Be sure to write for the booklet described above.




If you are a farmstead planning specialist you will be able to arrange the segments of your farming enterprise into an orderly, smooth-running management operation — and plot the buildings on the graph above. If you are not a farmstead planner, you *can* get valuable help from one of the select group of Doane Authorized Builders.

Why can Doane Authorized Builders help you? They are carefully selected and trained by professional Doane farm managers and farm-building engineers—trained to analyze the present and future needs of each individual farm and to map out a logical step-by-step program of time- and labor-saving buildings and their location in the farmstead. They are then prepared to give you complete building service with each building soundly constructed of top-quality materials.

This important money-saving service by Doane Authorized Builders is yours, whether you plan to build or remodel. Your problems may be very different from your neighbors'. Your future plans may be quite different, also. Chances are, no "canned" farmstead layout or building plan will meet your needs satisfactorily. A Doane Authorized Builder can help you custom-tailor a farmstead layout with buildings to fit your individual needs.

Profitable farming in the complex, competitive future will call for more knowledge, more skills than one man can normally master. That is why each Doane service is designed to help you concentrate on the things you do best, while providing the technical know-how in other areas to help you make more profits.

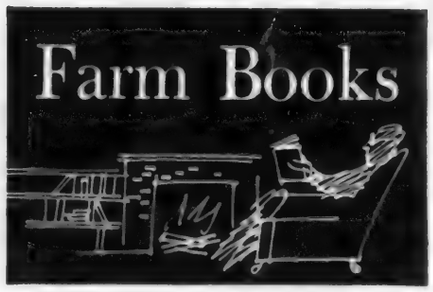
**Doane Gives You Facts Based on Experience**

Doane has a unique, down-to-earth understanding of farmers and their problems from:

- **forty years' experience managing thousands of farms and ranches.**
- **twenty years of furnishing facts and forecasts to farmers in the Doane Agricultural Digest.**
- **twenty-four years of providing companies with vital, accurate market-research information and product-testing service.**

*Write for the name of the nearest Doane Authorized Builder and a complete description of all Doane services. There is no cost or obligation of any sort.*

**DOANE AGRICULTURAL SERVICE, INC.**
5148 DELMAR BLVD., BOX 44, ST. LOUIS 8, MO.


**Farm Books In Europe** We asked Dr. Rudolph Seiden, a contributor who has recently returned from Europe, to give us an idea as to the reading material available to European farmers. He writes that nowhere did he see magazines as good as ours, but that a number of their books seemed well worth translating. In East Germany and other Iron Curtain countries he found a great many Russian translations, some of which he considered outstanding. Here are specific books which impressed him: *Samenatlas—Seed Atlas* by O. Heinisch; published by Deutscher Bauernverlag, Berlin; 258 pages; price, approximately $45 (195 Deutsche Reichs Mark). This beautiful book is printed in four languages: German, Russian, English, and French. It uses 122 double-spread tables to show 122 of the most important forage plants and accompanying weeds along with their seeds and fruits in excellent drawings—all in natural color. A concise descriptive text is printed on the margin of each page.

*Kartei fuer Pflanzenschutz und Schaedlingsbekaempfung,* by E. Muehle; published by S. Hirzel Verlag, Leipzig; price, $4.03. This is an illustrated card index (188 cards) giving farmers authentic information as to the protection of plants. It illustrates and describes insect pests and plant diseases and the control measures against them.

One of the books written behind the Iron Curtain, *Fiebernde Pflanzen—mehr Brot?* by A. Arland, an East German professor, takes up the problem of yield improvement. His major point is transpiration. He points out that plants often transpire twice as much water as is necessary to carry on their life processes—as though they were sweating feverishly. He describes the cultivation methods they are working on to limit this water wasting and to increase yields. This book is published by Akademie-Verlag, Berlin, and sells for $1.84.

There are also, of course, more standard works on soils, plant and animal breeding, fertilizers, etc. One of the most aggressive publishers in this field is Ferdinand Enke Verlag, of Stuttgart who has recently published *Magnesia,* by A. Jacob ($4.37) giving the functions of this fifth most important plant nutrient, methods of soil analysis, and deficiency symptoms in plants. They have also published a two volume set, *Bodenkunde* and *Pflanzenernaehrung* on soils and plant nutrition.

# CHORE-BOY MILKED COW SETS NEW NATIONAL 2X RECORD!

KINGVIEW FRANCY ALLEGRA • 38,672 MILK • 1239 FAT • 365 DAYS • 2X MILKING

## New National Champion Has Been Milked Her Entire Lifetime With CHORE-BOY Low-Vacuum Milkers

PAUL SCHINTZIUS, owner of this great cow writes.

"Naturally I am elated and proud of the wonderful record made by my pure bred Holstein, Kingview Francy Allegra. The remarkable thing about her achievement was that she had twin calves before freshening, which led to complications and got her off to a poor start. It was 4 months before she reached her peak production of 138 lbs. of milk in one day. She averaged nearly 106 lbs. per day.

I attribute her great record to fine breeding and the breeding program I have consistently followed; to the best care and feeding I was capable of giving her; plus real good milking.

She was milked during this period with a Chore-Boy L-10 floor-type pail milker. In fact, she and all the rest of my herd have been milked their entire lives with the Chore-Boy which I have had for 12 years. I have proved to my own satisfaction that Chore-Boy is the best milker, since I have tried two other well known makes, and each time have come back to Chore-Boy.

We have had very little trouble with mastitis over the years I have used the Chore-Boy. We have had 24 cows each of which have produced over 100,000 lbs. of milk during their lifetime. Production like that can't be obtained with mastitis in a herd. The udder health of our entire herd is remarkably good considering the high production. In my opinion the good milking results of Chore-Boy is due to the combination of low-vacuum and to Chore-Boy's method of pulsating.

The original pulsators, purchased with the milker 12 years ago, are still being used. I find them very easy to keep in good operating condition. Last year our herd of 32 milking cows averaged 17,401 lbs. of milk and 637 lbs. of butterfat. With such results I will stay with Chore-Boy. The only change I will consider would be to a Chore-Boy Pipeline Milking System.

I started dairy farming on my own 14 years ago with 5 top registered foundation cows and some grades. My farm and herd have had to pay their way, as my only source of income is the sale of milk and breeding stock."

Paul Schintzius

Dawndale Farms,
South Wales, N. Y.

Your Chore-Boy "Know-How" Man will, without obligation, help you plan your system. With his advice you will have an efficient plant, producing top quality milk, at lowest cost.

CHORE-BOY LOW-VACUUM MILKING SYSTEMS

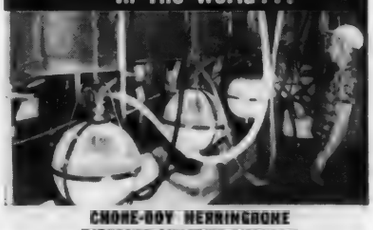
Write Dept. 29 for complete information

Your Chore-Boy "Know-How" Man is more than a dealer and a service man. He has been trained to help you put your dairy operation on a real money-making basis. See him today.

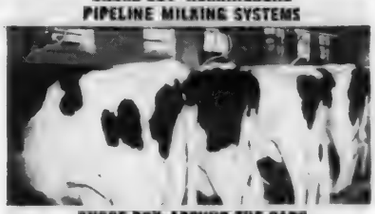
**CHORE-BOY MANUFACTURING CO. Inc. • Cambridge City, Indiana**

Formerly FARMER FEEDER COMPANY, Inc.

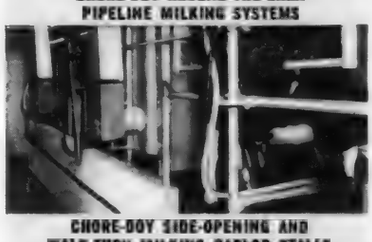
### CHORE-BOY Offers The Best And Most Complete Line Of Milking Systems In The World...



CHORE-BOY HERRINGBONE PIPELINE MILKING SYSTEMS



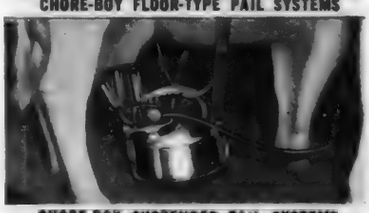
CHORE-BOY AROUND-THE-BARN PIPELINE MILKING SYSTEMS



CHORE-BOY SIDE-OPENING AND WALK-THRU MILKING PARLOR STALLS

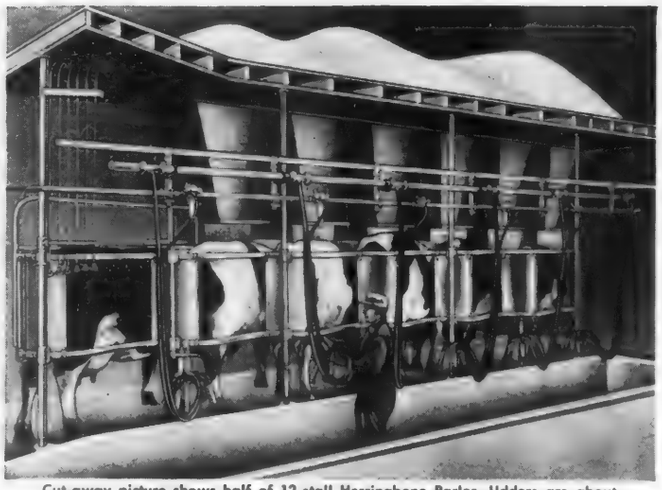
CHORE-BOY DIRECT-TO-CAN SYSTEM

CHORE-BOY FLOOR-TYPE PAIL SYSTEMS



CHORE-BOY SUSPENDED PAIL SYSTEMS

CHORE-BOY LACTORIUM IS A COMPLETE MILK PRODUCING PLANT — INCLUDES BUILDING AND MILKING SYSTEM



Cut-away picture shows half of 12-stall Herringbone Parlor. Udders are about 3 ft. apart. Cables release an accurately measured portion of feed for each cow.

***Facts on the new Herringbone Stalls***

# How to pick the right milking parlor for your herd

You'll probably install a modern parlor within the next few years.

This means you must decide *which* type is best for your particular operation. Here are facts which will help you make the right decision.

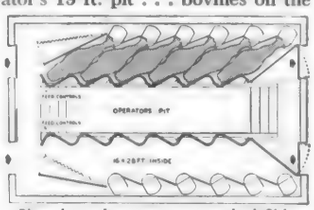
There are 3 basic types of milking parlor stalls which permit fast, efficient, no-stoop milking.

First to be developed was the Gate-type stall. Next the tandem Walk-thru stall and now, the Herringbone system which has stirred so much excitement since its introduction from New Zealand last year.

**The "cow-a-minute" Herringbone** . . . A skilled, fast operator will milk *and feed* 60 cows an hour in a 12-stall Herringbone parlor, but 55 an hour is a better rate for the average man.

Two features make this possible. First, with the usual 12-stall Herringbone parlor, 6 cows enter and leave at a time. This doesn't take much longer than the time needed for 2 cows to enter and leave a Walk-thru stall. Cows move better in groups, and there's far less opening and closing of doors and gates than with other type parlors.

Also, the diagonal Herringbone system allows 12 cows to be closely packed along the sides of the operator's 19 ft. pit . . . bovines on the



Plan shows how cows are packed. Side by side, cows are quiet in Herringbone.

bias. This is possible because the neck of one fits naturally against the belly of the next. (See diagram above.) Not only does this close packing save the operator many steps, but cows like the close fitting . . . each stall takes only ⅔ as much floor space as a Gate-stall and only ⅔ as much as a tandem Walk-thru stall . . . and cost per stall is substantially less.

**Advantages of Gate-type Stalls** . . . Gate-type stalls are ideal for letting you give personal attention to individual cows . . . for example, high producers or slow milkers . . . because only one enters at a time. They also offer a good opportunity to show a fine animal. Thus, they are a good choice for the farmer with top producers or who sells breeding stock.

However, Gate-type parlors cost more per stall since they require heavy gates in the rear and almost 100 sq. ft. of floor per stall.

**Walk-thru Stalls for most herds** . . . Walk-thru parlors let 2 or 3 cows enter at a time and cost less than Gate-type stalls. This is mainly because they need no rear gates or rear alley and the building can be much smaller. In general, Walk-thru parlors are the best and most economical choice for most farmers with medium size herds.

**Clay Herringbone Features**

**1. Much heavier frame at rear. Posts to ceiling permit attachment of cross member to carry air, water, and milk line.**

**2. Feed is supplied from overhead through non-clogging chute. Up to 1400 lbs. of feed is available for each stall.**

**3. Accurate metering of feed by cables grouped at entrance end.**

**4. Very large, 18"x24" feed pan and a shield prevent cows from spilling feed.**

**5. No floor attachments are located under feeders. This makes washing out easier. Posts have stainless steel sleeves at the point where they enter cement.**

**6. Galvanized finish cleans easily; needs no repainting.**

**With the CLAY Purchase Plan, you can build your parlor NOW!** You needn't wait. CLAY Plan requires only 20% initial investment. Enjoy and profit from your parlor as you pay for it. Ask your CLAY Dealer for more information or write to CLAY.

**Free Planning Book** . . . New 16-page book has up-to-date material on all type milking parlors. Farm planning ideas and building tips also included. Write to CLAY . . . *today!*

CLAY **CLAY EQUIPMENT CORP.**
692 Fulton St., Cedar Falls, Iowa

**Methoxychlor Dust OK** USDA's Agricultural Research Service has approved the use of methoxychlor for control of hornflies on dairy cattle but only when applied as a dust treatment. The use of this material as a spray for dairy cows is not permitted for the control of hornflies or any other insect pests, but it can be used in dairy barns as a residual treatment for the control of stable flies and houseflies.

This new approval of the USDA is based on a recent decision of the Food and Drug Administration which stipulates that while no residue of methoxychlor is permitted in milk, there is no objection to the use of the insecticide dust on dairy cows. When the methoxychlor is properly applied (one heaping teaspoonful applied on the poll, neck and back) as a dust treatment, it provides excellent hornfly control for about three weeks and no residue occurs in the milk.

One precaution is giving some farmers an understanding laugh. If you apply a dust, keep the cows inside if it rains. Because rain plus dust equals slurry, and the use of slurry is forbidden—and can lead to the forbidden methoxychlor residue in the milk.

**Short Reports on New Findings** Newly published research from the University of Illinois is particularly damning to the fly. Stable flies can cause losses of butterfat and milk production to about 0.7 per cent per fly per cow. Good control of the stable fly saved over 20 per cent of the butterfat production for the five-month fly season, May to September.

■ Using a new, nose-pushed, self-priming pump, a cow can water herself. The Utina waterer has a paddle for the cow to nuzzle, pumping water from 20 feet down or 80 away. It is portable (60 pounds) and each unit can serve 30 cows. Handled by Starline, Inc., Harvard, Ill., or H. D. Hudson Mfg. Co., Chicago, the unit is self-lubricating.

■ A double rubber tube is offered as a replacement to the trocar for bloat. Instead of carving a hole in the cow's side, you make her swallow the tube. No drenches. Once swallowed—with one end out of her mouth, you use a hand pump to inflate a little balloon on the inside end of the tube. This floats the tube up to the top of the rumen contents. Then gas can escape from the other half of the double tube. Sells for $19.95, from National Agricultural Supply Co., Fort Atkinson, Wisconsin.

■ An automatic milking machine unit has been used with a pipeline milker on the University of Wisconsin Electrical Research Farm for about a year. Each milking cup has a float valve at its base, which cuts off suction about 18 seconds after milk stops flowing. Then the cup falls off the teat. The device will not allow the cups to be left on too long, and should reduce the mastitis caused by such over-milking. The units are weighted to strip automatically. They are washed under pressure for proper cleansing.

■ The effect of temperature and humidity on cattle is part of a long-term study at the University of Missouri. Temperature change between 40 and 75 degrees (with relative humidity between 55 and 70 per cent) did not affect milk flow. Milk fell off severely above 75 degrees. Holsteins were more tolerant of cold, maintaining milk production even at 10 degrees, whereas Jersey milk flow began to decline at 30 degrees, was 20 per cent off at 10 degrees.

■ No one knows what this California doctor really said, but the newspaper reports of what he said were enough to enrage the National Dairy Council (and others). He was quoted as saying alcohol was better than milk in the diet of "oldsters." Youngsters are still advised to stick to Milktinis or Creamhattans.

# BEST YIELD FOR THE DOLLAR IN ALL AMERICA

# STUDEBAKER TRUCKS COST LESS

## ...OFFER LOWEST PRICE AND HIGHEST ECONOMY OF ANY FULL SIZED TRUCKS YOU CAN BUY

For all out, most for your money value, there's nothing that beats Studebaker trucks. They're designed and engineered to give you the rugged, day after day, year after year service you want and need in a truck.

**HIGHEST ECONOMY** Studebaker economy begins with the lowest price of any full-sized trucks. They have lower operating costs, lower maintenance costs, and are all engineered to carry greater payloads on low-cost regular gas.

**GREAT VERSATILITY** Studebaker pickups are available in ½ and ¾ ton sizes, both on 112" or 122" wheelbase with 6½ or 8 foot pickup boxes. Or, you can have stake or flatbed bodies. Larger trucks are available in 1, 1½ and two ton sizes, on 121, 155, 171 and 195 inch wheelbases.

**RUGGED SERVICE** Whichever body style you choose, you can be sure that each model is carefully engineered for years of trouble-free hard work and continuing low cost. It will have higher trade-in value, too!

Check these added Studebaker features for extra service and economy:

**WIDEST CLEAR FLOOR PICKUP** box available in the industry lets you carry more. It's 51½ inches wide!

**HEAVY GAUGE** double-thick, steel walls and all-steel ribbed floors stand up under years of punishment.

**TWIN TRACTION** powers you through snow, mud, sand or ice because power goes to the wheel with the greatest traction.

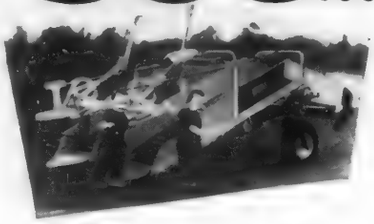
**COMFORT CONDITIONED CABS**—all weather protection—adjustable seats—full foam cushions—electric wipers—safety door latches—seats 3 in comfort with more legroom.

**UNDER-HOOD ACCESSIBILITY.** All wiring within easy reach behind instrument panel—not under it—reduces service cost and lost time. Only Studebaker gives you this time and cost saving feature.

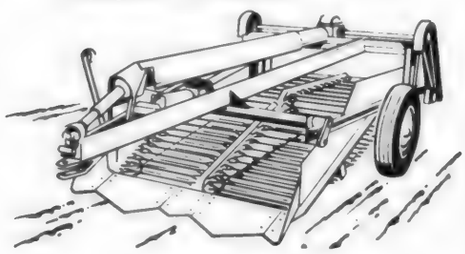
**ECON-O-MISER 170 CU. IN. CYLINDER ENGINE.** Simplified design for easier home maintenance and greater fuel efficiency. Automatic spark control and pressure lubricated tappets are standard.

## MOVE MORE—SAVE MORE WITH STUDEBAKER TRUCKS

# see... our family has grown too!

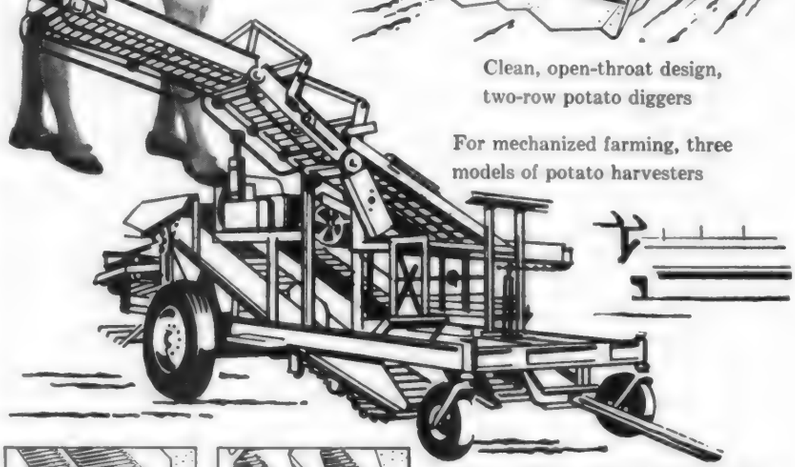


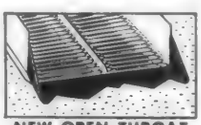
Sprouting like spuds since the model above was introduced 18 years ago, we've developed the fullest line of potato harvesting equipment available.



Clean, open-throat design, two-row potato diggers

For mechanized farming, three models of potato harvesters





NEW OPEN THROAT

TWIN THROAT

New open-throat models for 32, 34 or 36-inch row spacing (single or double conveyor). Also twin-throat standard model for 38, 40 and 42-inch rows.

# we also have a new addition

New OK Champion giant 215-ft. Boom Sprinkler and quick-couplers give best and most economical approach to large scale controlled sprinkler irrigation.

**CHAMPION CORPORATION**

4791 Sheffield Avenue — Send for FREE Circular — Hammond, Indiana

**Beer and Love Make Best Beef**

Now we have heard everything. Col. Jim Sweeney, whom we soldiered with in the South Pacific, writes in to tell us that he has discovered the best steak in the world, in Japan, of all places, and it's fattened on beer, of all things. But let's have Col. Sweeney tell his own story:

The world's tenderest beef comes from Kobe. It is a product of continuous hand massage, elimination of exercise, and copious quantities of beer. They call the breed, "Tajima-ushi" and it has a carefully recorded history of over 1,000 years.

Each cow is raised as a household member of a rural family. By ancient tradition every person in the home has a duty to perform in fattening the animal. The eldest son is the only one permitted to take the animal on its limited walk to a watering trough. The most beautiful daughter is responsible for the daily massage. The housewife carefully mixes the feed and the farmer keeps the animal clean.

The animals selected for fattening are mature females over three years of age which have never borne young. They are fed a diet of beer, bean curd, barley, wheat, rice bran and soy bean cake. Of this concentrated feed, barley forms the major item. The cereal gives the meat firm, white fat; wheat bran improves the texture of the flesh; rice bran gives sweetness; and soy bean cake adds special flavor to the meat.

A daily bath, brushing and spraying with insecticides are the required procedure.

Some epicurians attribute the tenderness and flavor of Kobe beef to the generous amounts of local lager that each cow is encouraged to consume, and the practice of showering her with love and affection. Yoki Hagamatsu, a Japanese cow farmer, says, "A bucket of beer each day and constant pampering turns out the best beef."

Other experts say that the secret of these delicious cuts is due to the daily hand massage. Generally the rubbing and kneading lasts from two to three hours. It may well be a combination of beer and rubbing, for the massage usually takes place after the cow has been given a draft of brew. The animal often falls asleep during the process, a completely relaxed bovine.

Yoki Hagamatsu says, "We believe that an untroubled animal, raised without fear, gives the choicest cuts. By tradition our cows are made drunk before slaughtering. It is gratifying to see them happy and unawares of what is about to take place."

# It's new... It's revolutionary...

## CASE® 800 combine

*With Exclusive* cylinder and concave

# ON-THE-GO CONTROLS

## *from the driver's seat*

**you achieve sensational harvesting efficiencies under toughest crop and field conditions**

**Choice of 10, 12 or 14-foot grain headers . . . corn header available.**

Change concave setting easily on-the-go to suit condition of crop with this handy lever. No more stopping or ladder-climbing . . . just smooth, acre-after-acre operation.

Instantly, on-the-go . . . adjust cylinder speed* from 500 to 1300 r.p.m., with easy-to-reach lever to suit any crop stand. Read cylinder speed at a glance on direct-reading tachometer.*

## 15 GREAT "NON-STOP" HARVESTING FEATURES

• Instantly, on-the-go . . . adjust speed of 32-inch rub bar or spike tooth cylinder* • On-the-go concave clearance adjustable from driver platform • Concaves instantly drop when operator pulls pin • Variable speed traction drive, hydraulically controlled • Power steering* for accurate, effortless control over rough ground • Header raised or lowered hydraulically • 45 bu. grain bin unloads in 30 seconds • High speed cutting with 500 stroke-per-minute sickle • Reel speed variable to suit crop conditions • Big, floating feed rake adjusts to crop automatically • 3 extra-long straw-walkers • Variable speed fan • Lever-adjusted sieves • 5" sump type grain elevator moves grain gently with rubber flights • 70 b.h.p. engine—gasoline, diesel, or LP-gas

**Optional at extra cost*

## *See your local* CASE® *dealer . . .*

**Ask him to show and demonstrate the 15 on-the-go features of the new CASE 800 combine to you *today*.**

**You can put the Case 800 to work on your farm this season with the Case Crop-Way Purchase Plan that lets you buy now . . . make later payments as you have money coming in.**

# J. I. CASE

J. I. CASE CO. • RACINE, WIS.

*1st in Quality for Over 100 Years*

**MAIL for "On-the-Go" combine story**

Get all the facts about the new Case 800 on-the-go combine. Send coupon to J. I. Case Co., Dept. F-909, Racine, Wisconsin.

Name_____ Student ☐

Address_____

# Can you afford the luxury of lugging milk?

- **Old-fashioned bucket milking, and the lugging, lifting and pouring that go along with it, is an expensive luxury today.**
  - **It wastes time and labor, robs your profits.**
  - **That's why thousands of dairy farmers will switch to Combine Milking this year. And they'll do it at an average cost of only 3¢ a cow per milking.**

Maybe in the past you've put off switching to Combine Milking, thinking that you didn't need it or couldn't afford it. Or perhaps you first wanted to get that new tractor, baler or pick-up.

But how about now? Isn't *now* the time you should think more seriously about having pipelines carry your milk, cut your labor costs, build your milk profits and let you expand the size of your herd.

*Remember, next to hand milking, bucket milking is the most expensive way to get milk out of your cows and into your cans or bulk cooler.*

Doesn't it make good sense – and good economy – to let a De Laval Combine with in-place cleaning do *all* this work for you? Even more so this year because now the average De Laval Combine installation costs as little as 3 cents a cow per milking. Pays for itself in time and labor savings in just a short time.

10% down...
up to 4 years to pay

DE LAVAL

THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York

5724 N. Pulaski, Chicago 46, Illinois

DE LAVAL PACIFIC COMPANY
201 E. Millbrae Avenue, Millbrae, Calif.

### *Takes the chore out of milking...*

You'll smile, too, when you start milking the Combine way. You've never seen milking that's faster and easier.

Today, ask your nearby De Laval Dealer for a free estimate, right in your own barn, of the cost to install *your* De Laval Combine. Do it today. You'll be mighty glad you did.

# FARMHAND takes the work out of forage handling and feeding jobs!

## There's a Farmhand Feeder to fit every farm . . . look 'em over!

**BIG "420" FEEDER** speeds up all your forage handling, feeding and silo filling jobs. Load it in the field and haul 420 cu. ft. loads to silo or feedlot. Roller chain apron, three mixing beaters and 24″ conveyor belt give thorough mixing and smooth, dependable unloading. Sheet steel sides, ¾″ marine plywood floor mean lowest maintenance costs, longest life. Mounts on truck or heavy duty wagon.

**6-TON "POWER-BOX"** with 2-beater Feeder attachment combines huge 300-bu. capacity with the convenience of a 16″ auger-type discharge to save you time and labor. Long-life features include smooth worm-gear drive, roller chain apron, ¾″ marine plywood floor, aluminum and wood sides. Mounts on truck, tandem trailer or heavy duty wagon.

*FARMHAND . . . PIONEER AND QUALITY LEADER IN MECHANICAL FEEDING EQUIPMENT.*

**4-TON "POWER-BOX"** will haul, mix and feed up to 220 bushels at a time. Tough aluminized steel sides, ¾″ marine plywood floor, PTO-powered worm gear drive, 2 mixing beaters and 12″ discharge auger all add up to fast, dependable one-man feeding at lowest cost. Thousands of these medium-size Farmhand Feeders are now in use on successful dairy and beef operations.

***FREE* INFORMATION!**

*Write:* **THE FARMHAND CO.**

**Dept. FQ-59, Hopkins, Minn.**

Send information on _____

I am a student, send special material ___

Name _____

Address _____

Town _____ State _____

*A Division of Superior Separator Company*

**Farmhand**

FIRST IN FARM MATERIALS-HANDLING

*Ford 671 Select-o-Speed Diesel Tractor; Rear-Mounted Mower; Ford F-500 Platform-Stake Truck; Edsel Villager 4-door Station Wagon.*

# Summertime:

# and the mowin' is easy

Whatever the season, whatever the chore—you'll find your work load lighter because of Ford Power Farming.

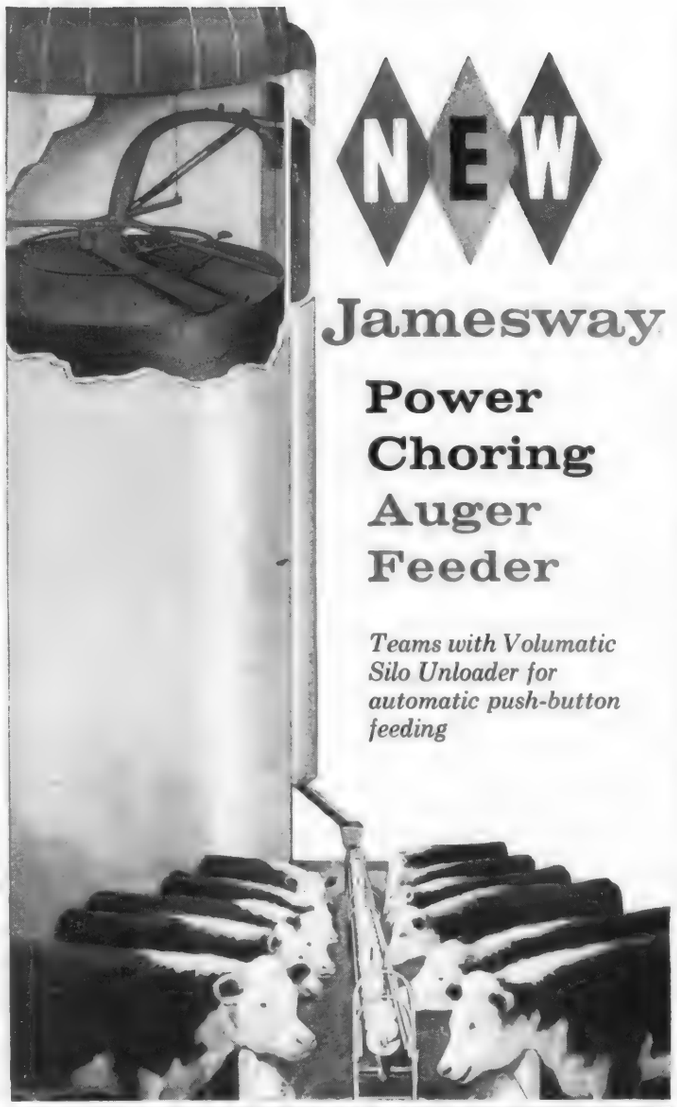
Look at this summer morning scene, for example. See how this rugged Ford Rear-Mounted Mower crew-cuts a 7-foot swath of hay. At 6 mph. its hydraulically controlled cutter bar will mow up to 5 acres an hour. That's speed! Now, let's look at economy.

That Ford 671 Diesel Tractor with Select-o-Speed—the new tractor transmission that lets you shift on the go—is mowing for about half the fuel cost of an ordinary gasoline tractor and with no loss in pulling power. What's more, Ford Diesels are in the same price range as comparable gasoline tractors of other makes.

These are two of the many varied examples of Ford Power Farming at work—to lighten your load, brighten your leisure. For full details about your applications, see your local Ford Farm Family dealer.

**FORD MOTOR COMPANY** THE AMERICAN ROAD, DEARBORN, MICHIGAN

THE FORD FARM FAMILY: TRUCKS • TRACTORS • IMPLEMENTS • CARS • INDUSTRIAL ENGINES



NEW

Jamesway

Power Choring Auger Feeder

*Teams with Volumatic Silo Unloader for automatic push-button feeding*

NEW FREE-FLOATING AUGER FEEDER

No bearings on this auger to wear or service. Means extra-smooth feed-flow . . . no hang-up, no "hammering." And a low hp motor is plenty.

CONVENTIONAL BEARING-TYPE AUGER FEEDER

Conventional bearing-type auger "bangs" and plugs. Costs more to maintain. Needs a big-powered motor.

This new Jamesway *Auger Feeder* is the simplest, most dependable feeder yet. No bearings, no hangers in the bunk . . . nothing to slow up feed. Builds a bunkful in no time . . . and cattle can't "nose" out feed.

Add the *Volumatic Silo Unloader* and you have full push-button feeding. Volumatic's exclusive Power Circle gives positive ring gear drive. Exclusive 3-point suspension assures smooth level cutting. See your Jamesway dealer about the new Auger Feeder and Volumatic Silo Unloader. For free catalog write James Mfg. Co., Dept. FQ-69, c/o your nearest division office.

Hog equipment

Big Jim silo system

— loads

— unloads

BUY NOW PAY LATER

FIRST IN POWER CHORING®

Jamesway®

A DIVISION OF ROCKWOOD & CO.

Fort Atkinson, Wis. • Lancaster, Pa. • Los Angeles 63, Calif.

FOR POULTRY • FOR DAIRY • FOR LIVESTOCK

CF-2-9R


# LETTERS

## Wrong Dose

Sirs:

Your Spring issue article entitled "Turning the Worm." The inset states "Calcium oxide and calcium anthranilate."

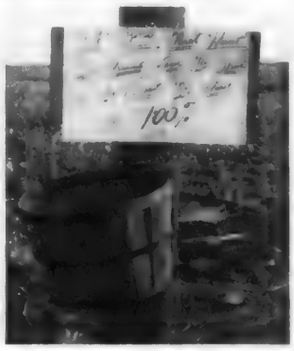
These are new worming agents. Possibly you mean cadmium oxide and cadmium anthranilate. In reading the complete treatise on worms I find the correct terms were used in the article itself.

Enjoy your magazine very much and seldom find factual errors.

Hanson Veterinary Clinic — Morris Hanson
Calgary, Alberta, Canada

**We are sorry. It was our error and Dr. Hanson is quite correct.**

## Pay Hunting



Sir:

Enjoyed your article, "Hunting as a Cash Crop." Thought you might be interested in a much simpler way of setting up a hunting preserve. I made the enclosed snapshot on one of my trips last fall. The sign reads: "If you must hunt my pheasants, leave my share in the basket. My share is 100%."

Tom Milligan
Springfield, Illinois

Sirs:

We enjoyed the article about hunting preserves in the Spring issue but Mr. George Laycock must have obtained some of his cost figures from one of the feed companies rather than from the farm operator.

In the first place he suggests that pheasants should be about 14 weeks old at release time. At fourteen weeks Mr. and Mrs. Pheasant do not yet have their full plumage: this they don't acquire until 20 to 21 weeks and birds released at the 14-week age will not impress anyone, although 14 weeks of age is the most economical dressing age for market birds.

Next, Mr. Laycock suggests that "the total cost of a pheasant reared to releasing age comes to around a dollar a bird, not counting labor and building costs." If he can produce birds at those prices he is welcome to this old farm. These figures are again those furnished by feed manufacturers and are given for live birds raised under absolutely ideal conditions (no food wasted by scratching birds, etc.). They do not take into account advertising. In addition, his dollar birds are only 14 weeks old and cannot be released for at least another 6 weeks.

Since pheasants are game birds their egg-laying cycle is limited to the Spring and early Summer. The *latest* hatches leave the incubator in early August. Now since we hunt until March 31 here in Virginia you can readily see that the birds shot in March must be much older than the 14 weeks Mr. Laycock mentions so many times.

Then, too, in regard to the holding pens: the author suggests "the holding pen should be at least 144 by 24 feet." Yes, so it should, but there must be many of them.

Please excuse the criticism of the article but the figures were so misleading that we couldn't resist writing.

Cost Accounting was a profession which I followed for a number of years and costs here at the farm are one of my pets.

HOF Game Bird Farm — Helene and Francis Omlor
R.D. 1, Oakton, Virginia

## Suspension Fence

Sirs:

We have just read the article on fencing in the recent edition of THE FARM QUARTERLY. We were disappointed to find that your experts apparently are not conscious of the fact that there is an entirely new type of farm and ranch fence in existence which we call the suspension fence. We have suspension fences which are ten years old now and which have never been touched. They have weathered the blizzards, the dust storms, the tumbleweed storms and everything that eastern Colorado can dish out and are in perfect condition.

Here in Colorado we use steel posts. Our posts are spaced a hundred feet apart, the twisted stay wires are spaced twenty feet apart, the bottom wire is twelve inches from the ground and the wires are spaced at intervals of ten inches. In a five-wire fence such as ours, this means the top wire is fifty-two inches from the ground.

In the case of a farmer who wished to use some type of wooden post, then it would be necessary to use some type of wire fastener such as our "fence grippers." These gadgets were invented by us about twenty years ago. These fence grippers replace the old-style staple and are good for the life of the fence. We have had cars and trucks run through our fences, breaking all five wires, and have failed to dislodge a single fence gripper.

Matheson, Colorado — Tom Lasater

*Your next step—*

# Push-button Baling!

## *As master of the new self-propelled HAYCRUISER, enjoy a new world of effortless baling!*

Take your seat at the Cruise Control Center. You're in 100% command! Controls are right at your fingertips. Push a button, pull a lever—the Haycruiser 178 responds instantly!

Here is a new high level in performance . . . true *push-button baling*—made possible by New Holland's 19 years of scientific leadership in Grassland Farming!

Naturally, you look for exclusive FLOW-ACTION on this most-advanced baler. And there it is—swift, gentle in action, ready to turn out leafy, nutrient-rich bales of uniform density—any size you want (12" to 52" long)—up to 400 an hour!

It's as easy to handle as a car! The 3-speed transmission lets baling speed be independent of ground speed . . . the big 51-horsepower engine makes every baling job a breeze. Get to know *all* the advanced features on this, the most sensational baler ever offered. See it, "drive" it at your dealer's now. Or write New Holland Machine Company Division of Sperry Rand Corporation, New Holland, Pa.

**NEW HOLLAND** NH *"First in Grassland Farming"*

BALERS • FORAGE HARVESTERS • MOWERS • RAKES • HAY CONDITIONERS • CROP DRYERS • CROP DRYING WAGONS
MANURE SPREADERS • FERTILIZER DISTRIBUTORS • FORAGE BLOWERS • COMPLETE CROP-HANDLING LINE • FARM WAGONS • BALER TWINE AND WIRE

# WE PLAN...YOU PROFIT

IRRIGATION pays big returns. Irrigation is a big investment. There are risks, mainly in system efficiency.

Any pipe, any coupler, any sprinkler, any pump, when put together, will likely function. How well they function is a question. How costly is a question. How dependably is a question. Any question on the wrong ledger side is expensive. Reduce the risk. Irrigate confidently with a Gorman-Rupp dealer's engineered system, designed for farm profit.

When a Gorman-Rupp dealer sells an irrigation pump, he usually designs the complete system in which it will be used. He tailors this system to water source, land contours, crops, soil, acreage, possible expansion, expected area rainfall... to name just a few factors.

It takes a lot of study, a lot of knowledge and practical experience. It pays off for the farmer. If you are considering irrigation, see your Gorman-Rupp Pump dealer. He offers irrigation systems fitted exactly to your needs.

Mr. Sterling Evans, President, Evans Orchard Supply Co., Kansas City, Missouri, says, "We select Gorman-Rupp Pumps because **(1)** we can depend on them to deliver the gallonage and pressure shown in their specifications **(2)** they give dependable, efficient operation **(3)** they are easily serviced **(4)** The Gorman-Rupp Company is fair in its dealings and **(5)** we get prompt shipment on both original pump shipments and repair parts."

## THE GORMAN-RUPP COMPANY

305 Bowman Street • Mansfield, Ohio

## Now a combine, now a corn sheller...*both* tops!

# THAT'S OLIVER TEAMED-POWER

Here is the dream of years become a reality: *the all-purpose harvester*. Here is a self-propelled marvel that takes all crops in stride—a combine famed for its capacity, *plus* a picker that far outperforms the best we've known till now.

***THE COMBINE*** is the Oliver 40, geared for high output all the way. Headers up to 16 feet...a record cleaning capacity...57-bushel grain tank...9-inch unloading auger. Smooth, 6-cylinder gasoline or diesel power. Heavy-duty, 6-speed transmission. *There's* a combine! And what's more...

***IT'S A SHELLER, TOO!*** Just take off the grain header, put on the row-crop header—then watch this corn sheller go to town. It doesn't do *one* job; it does *three;* cuts, shells, shreds—all three at once! Not only that, but this amazing machine gets *all* your corn —leaves not a bit shelled out in the field...actually brings in an extra bushel with every eight you pick! Where else would you find a combination like this? Nowhere but at your Oliver Dealer's—this is Oliver's TEAMED-POWER!

THE OLIVER CORPORATION
400 W. Madison St., Chicago 6, Ill.

## See Your OLIVER DEALER and See

## WHAT'S STUBBORNER THAN A MULE?

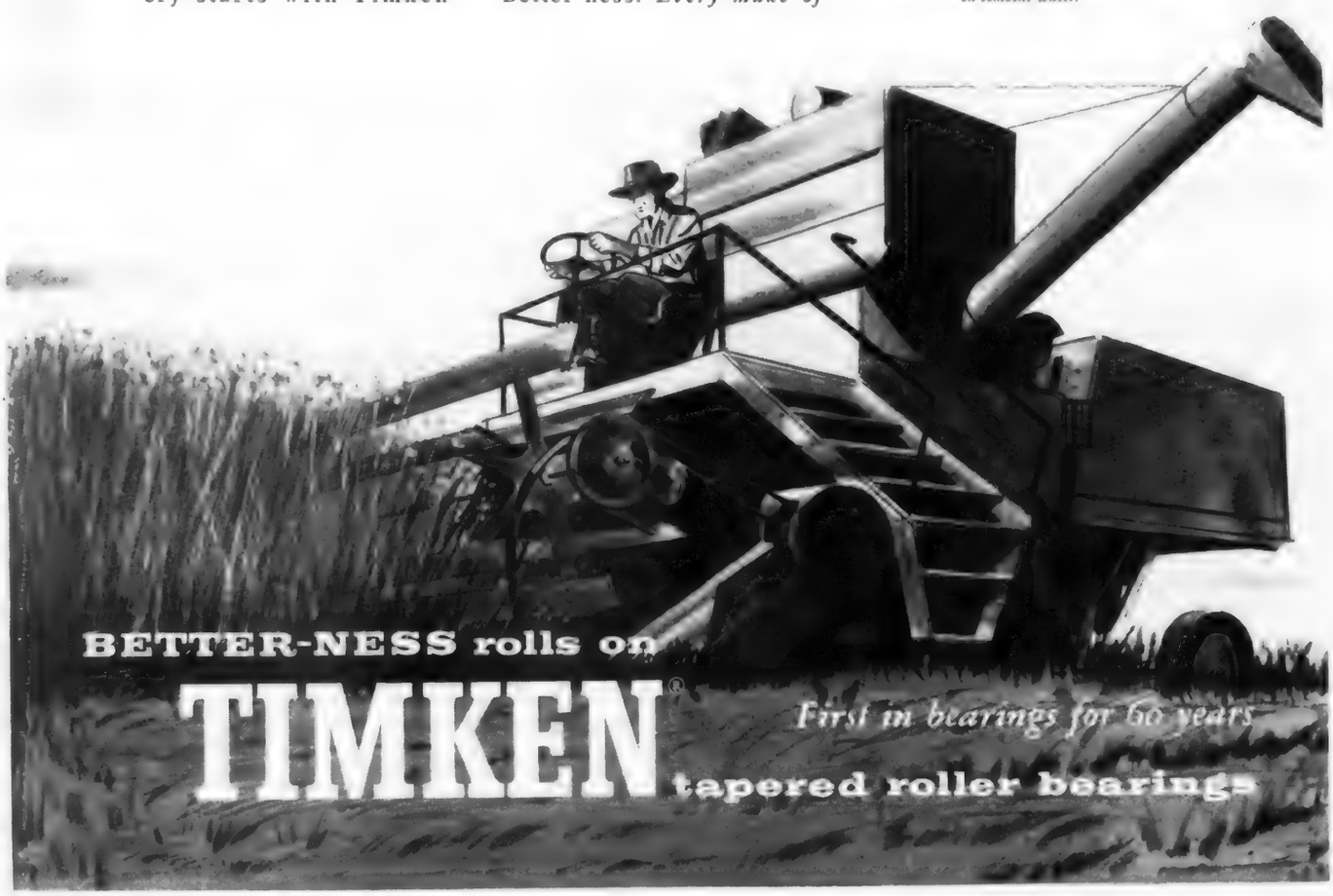
The answer is 33 mules—that's what it took, along with 4 men, to run a combine 60 years ago! And it took the four men lots of time to fix it when it broke down which was pretty often.

Today the stubbornness is gone. Thanks to the farm equipment industry, smooth, efficient combines glide through seas of wheat to help feed a nation that's more than doubled in population. And today, one farmer sits up there all alone, harvesting more wheat than 4 men and 33 mules used to. And with few breakdowns. That's Better-ness!

Better-ness in farm machinery starts with Timken® tapered roller bearings. They practically eliminate friction on wheels and shafts, keep machines going without breakdowns. And Timken bearings are *tapered* to take the terrific loads of farming from *all* directions—up, down, sideways. No wonder Timken bearings are the least expensive bearings you can use. They *roll* the load, season after season. We even make our own steel—a quality step no other American bearing maker takes.

Farmers who know bearings prefer "Timken" 6 to 1. So look for Timken bearings on all the machines that give you Better-ness. *Every make of American tractor uses Timken bearings—more and more implements are using them, too!* The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

*Typical application of Timken bearings on combine wheel.*



*Profit engineered . . . from boar to bacon*

# LIFE CYCLE FEEDING

## *Here's how it could help you make $20 more† per sow this year*

**If you've ever seen a group of swine herd records, you'd have seen one fact clearly: good producers could get "fat" on a market "lean" enough to make the average producer go under.**

**How "fat"?** Here's an example: "High-income hog farms had $11,485 more net income than the low-income group."—*Illinois survey, 7/58.*

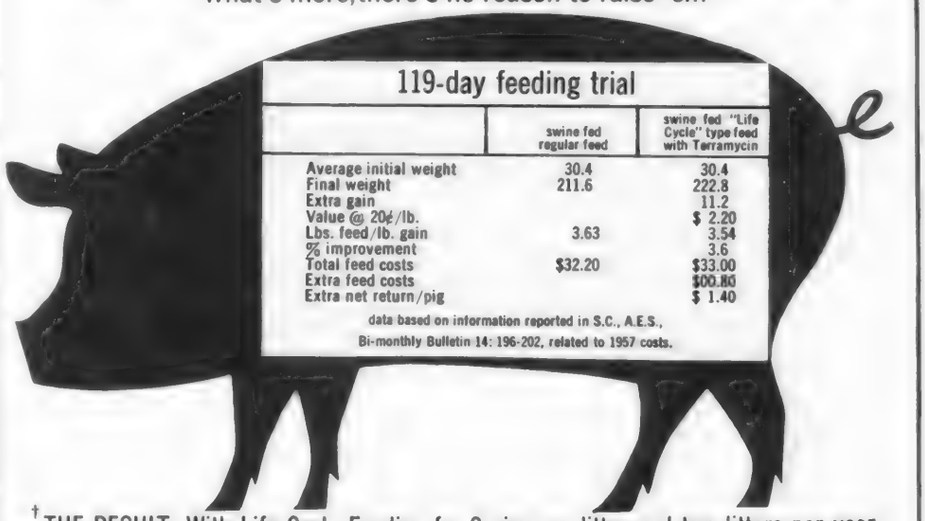
**How "lean"?** "Top producers who do a good job can weather price slumps down to $10 per cwt."—*1957 Almanac.*

**What's "average"?** Good producers got more than twice as much pork per litter: "Average total litter weight at 5 months was 1486 lbs. for the high ¼ herds; low ¼ herds, 698."—*Swine Cooperative Study, 1956.*

**What's the answer?** High profits result from good feeding, breeding, management. The best way to get the most out of good management and breeding is with your feed manufacturer's Life Cycle Feeding program.

## YOU CAN'T AFFORD AVERAGE SWINE

What's more, there's no reason to raise 'em



**119-day feeding trial**

| | swine fed regular feed | swine fed "Life Cycle" type feed with Terramycin |
|---|---|---|
| Average initial weight | 30.4 | 30.4 |
| Final weight | 211.6 | 222.8 |
| Extra gain | | 11.2 |
| Value @ 20¢/lb. | | $ 2.20 |
| Lbs. feed/lb. gain | 3.63 | 3.54 |
| % improvement | | 3.6 |
| Total feed costs | $32.20 | $33.00 |
| Extra feed costs | | $00.80 |
| Extra net return/pig | | $ 1.40 |

data based on information reported in S.C., A.E.S., Bi-monthly Bulletin 14: 196-202, related to 1957 costs.

†THE RESULT: With Life Cycle Feeding for 8 pigs per litter and two litters per year. AN EXTRA $22.40 INCOME OVER FEED COSTS PER SOW PER YEAR.

A short definition of Life Cycle Feeding would be something like this:

*Feeding for the specific needs of each stage of the Life Cycle of swine.*

That's a *simple* definition. Open a feed bag; you'll find more of a story:

**—Feeds for each stage of the Life Cycle match different nutritional *needs.*** (Pigs need lots of protein and minerals . . . weaners need higher levels of vitamins and antibiotics . . . bred sows need 5 times "normal" amounts of vitamin A, etc.)

**—Each stage presents different nutritional *problems* calling for special feed attention.** Some are "normal" . . . and some (lactation and weaning, for example) are critical. This means the nutrient balance is especially important during these stages. To raise well-doing swine, feeds must have extra-high fortification with vitamins, antibiotics, etc.

**—Each stage has its periods of stress** (castration, worming, weaning, disease, etc.) These periods call for special, fortified rations with high levels of antibiotics and nutrition if gains are to be maintained.

**—And each litter has its own set of "normal" conditions, depending on the disease level of the farm, management conditions, etc.** Often these conditions border on stress. Under typical commercial swine production conditions, the help of antibiotics, extra vitamins, etc. is needed for top results and profit.

Complicated? You bet! That's why it's a safe bet anyone feeding a "regular" simple program today is losing potential profit—fast . . . why only with Life Cycle Feeding and management can you top the market with high-profit hogs.

See your feed manufacturer for full details on his program of Life Cycle Feeding. Have him show you how it will fit your present operation more profitably.

**One of the many ingredients added to modern Life Cycle feeds is Terramycin. Here's what it means to profits as shown in college studies:**

- **FASTER GAINS—10% more**
- **BETTER FEED EFFICIENCY—7.5% better**
- **LESS FEEDING TIME—17 days less**
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# How to Blast a Stump

**Col. A. H. Hooker gets stump land into grass with the aid of a powder monkey, dynamite, and big machinery.**

By Joseph Muir — Photographs by Joe Munroe

FOR THIRTY YEARS Col. Albert Huntington Hooker has been accustomed to having his orders obeyed—now! And there are people in Pierce County, Washington, who swear he "orders the stumps out of the ground." Others say that it is only because of the Colonel's money that he has been able to clear 400 acres of a 1200-acre stump ranch and still remain solvent.

Al Hooker admits rooting stumps out of the ground has been an obsession with him for 20 years. His friends say he is like the bumblebee. Engineers say the bumblebee's wing span is not wide enough for his body weight, but the bumblebee doesn't know this and flies anyway.

Col. Hooker, two hundred pounds of bustling, grinning energy, has brought ideas and know-how to countless owners of cut-over lands in Western Washington with his "try anything" efforts at finding methods of clearing land and putting it to use.

He first came to Washington in 1928. Stump ranches were merely something he had read about until the train started down the western slope of the Cascades. Then thousands of acres of cut-over timber lands, scarred and desolate, stared back at him through the Pullman window. He decided that here was a blemish on nature he would do something about.

**Col. Hooker (left) likes to burn stumps. The fan boosts the flames. Hooker spends $500 to clear an acre and get it into grass (below). But the grass is good; each acre will produce two grass-fat calves in a year.**

In the United States there are some 120 million acres of cut-over lands; there are 84,000 owners of cut-over ranches and farmsteads, varying from 10 to 5,000 acres in Oregon and Washington alone. These acres are cheap and easy to buy, but are stubborn and costly to clear.

Eventually, they may represent an investment of $500 an acre. Many have gone broke clearing them; a few have got rich.

Until Col. Hooker modernized stump clearing, the process had been slow, with nature doing most of the work.

"Since I returned from the war," he says, "I have purchased 1200 acres in both Thurston and Pierce counties bordering the Nisqually River. This is not only a beautiful river, but a source of irrigation water for my cleared land."

Most of this land was in stumps and uncleared. A Soil Conservation Service survey determined that he had at least 600 acres of Class II to IV land suitable for good crop production with the balance in Class V and VI. All Col. Hooker had to do was boost the stumps out and get it in grass.

A great amount of tree and bushy regrowth has come back between the stumps in the past 60 to 75 years since the original logging operation. This includes Douglas-fir, pine, alder, cottonwood, white fir, huckleberry, willow bushes, bracken fern, and weeds and shrubs which have added both income and grief in clearing.

"I knew I had a bear by the tail soon after I bought my first piece of cut-over land back in 1940," Col. Hooker confessed. "Especially when the cost of digging those stubborn stumps out of the ground began to make my banker shudder."

After a few acres were partly cleared with small, inadequate equipment the Colonel was so sore of muscle he resolved if he was going to build a better acre he must find better methods than human muscles.

He tells his own story: "When I first started clearing I tried the methods then known in this area. We first used a horse and a winch to pull out the smaller stumps. You anchor the winch, attach a cable to the stump, and walk the horse around the winch to wind up the cable. This was too slow for me, so I tried burning the stumps in the ground. We would drill a hole two to three feet into the top of the stump and pour in sulphuric acid. This would eat down into the wood, taking from one to two months. Then we bored a horizontal hole into the stump to connect with the vertical hole which then became a chimney. After a fire was started at the base of the stump the flame ate into the heart of the stump through the chimney." It took weeks to burn out a stump. It was cheap, but it also was too slow.

"I was soon convinced that power equipment and blasting powder were the fastest, though more expensive methods of clearing. My first bulldozer, a small Caterpillar D-4, did a fair job on small stumps but it took a lot of tugging to get out the 3 to 5 foot thick stumps, and we were stuck on the big 8 to 10 foot diameter giants even after blasting them. So I tried larger and more powerful

**Fred Sutter (above), an expert powder man, taps a stick of stump blasting powder for a fuse. Right, the fuse is inserted. Below, the charge is tamped home under a stump.**

D-7 and D-9 Caterpillars, an International TD-13 and an Allis-Chalmers 5. I stocked up on dynamite and we settled down to a steady diet of blasting stumps and burning.

"I had to learn about the dangers of handling blasting powder through the University of Hard Knocks, even though I am a chemical engineer. About 3 p.m. one day in the summer of 1948 I was in Tacoma talking on the phone to my daughter Mary at the farm. She had called to say the powder house was on fire. While we were talking I heard a terrific blast and the horror of it struck me. 'Mary,' I shouted, 'go for help. I'll be there as soon as possible.' The 3000 pounds of 40 per cent gel blasting powder I had had on hand for several months had blown up.

"I had bought four tons of surplus powder from the Navy at a very reduced price and had been using it steadily for two years. The thing I had forgotten was that powder should be turned over every 60 days to prevent the nitroglycerin from settling out. Some of this had settled out of the bottom of the pile and ignited spontaneously. It must have burned for a few minutes until it sparked a signal flare stored in the same room and this detonated the whole works.

"I called my insurance man, picked him up and was at the farm in 25 minutes. It was a sickening sight. Every building on the place was either flattened or knocked out of shape. My daughter's girl friend, visiting at the farm, was standing in a grove of trees by the house. A plowshare was blown into the air and it hit a tree just inches from where she was standing. It was a miracle no one was hurt. Fortunately everyone working on the ranch was out in the field and away from the buildings. The blast shattered every window in the town of McKenna a half mile away.

"This taught me two things. To put powder in a separate building at least a quarter mile away from everything else, and store nothing with it that could make a spark. And I decided to purchase powder fresh in smaller amounts and use it up in a few months' time. I was more than happy that I had general accident and casualty insurance on my farm operations. The insurance company replaced the windows and helped me rebuild my farm buildings. It cost them $26,000.

"This didn't dampen my appetite for long. It just made me more careful and more appreciative of the power of blasting powder as a key item in the economics of rooting out stumps.

"Seems I was always getting in trouble with my blasting. One time I blew up a stump near my fence line. I was always misjudging the amount of powder to use and this stump blew to bits high in the air and most of it landed in the Centralia Power Company Canal. They sent me a bill for cleaning out the debris.

"The big explosion taught me a lesson. I headed for some expert help and found it in the person of Fred Sutter, a distributor for the Olin-Mathieson Chemical Corporation of Tacoma. Fred had grown up on a stump ranch near the company plant and with his father learned many tricks about the blasting of stumps. He soon became so good at it he was giving occasional demonstrations for this company. And he has done stump blasting ever since."

### Fred Sutter, Powder Monkey

The career of Fred Sutter as a powder monkey is a story in itself. He says, "I had been working eight years as a superintendent of schools, but I had to work on the side to afford to be a school teacher. Soon the tail was wagging the dog. I liked working with powder and could see the possibilities in western Washington with millions of stump land acres just begging to be cleared. When I was offered the dealership I cast my lot with blasting powder."

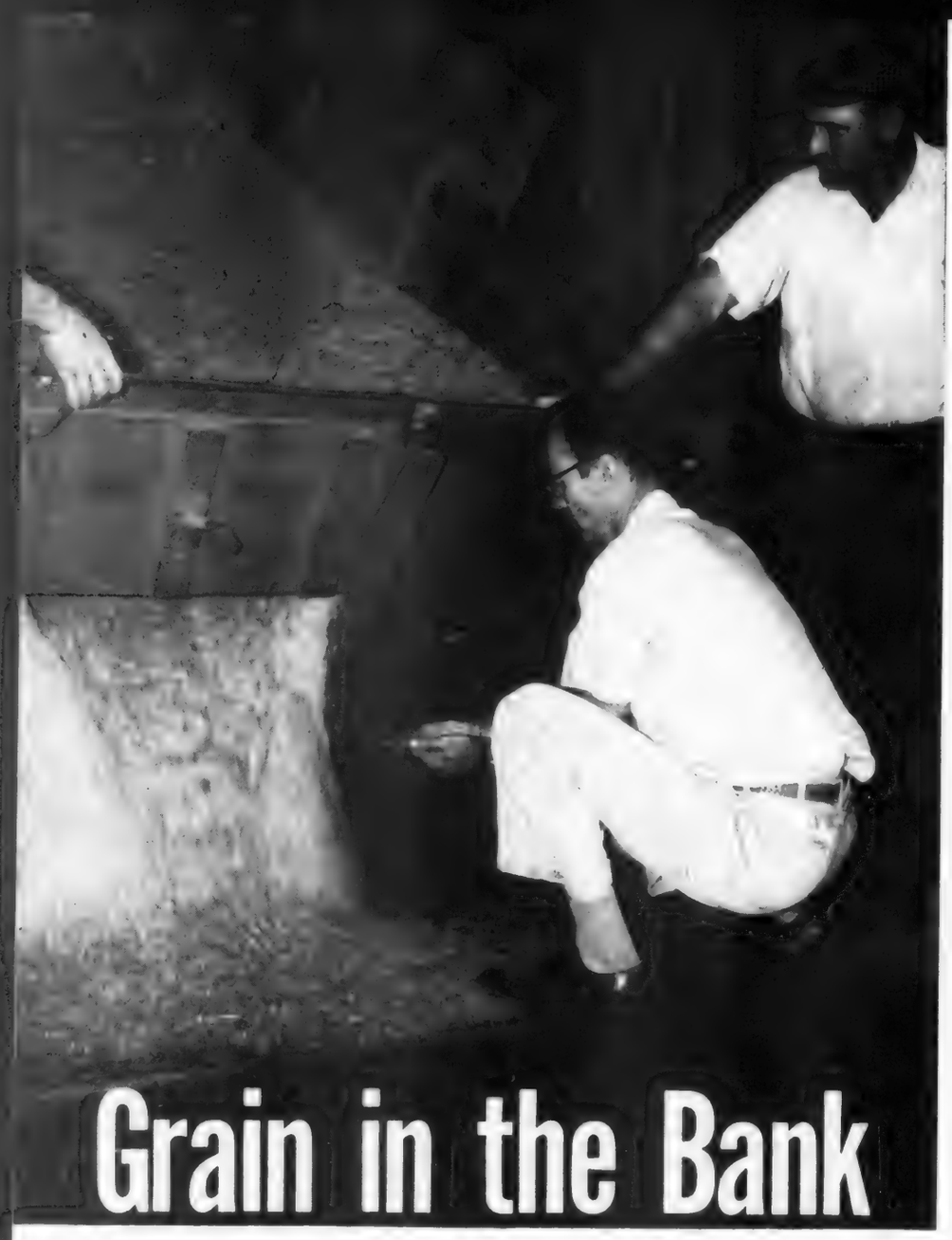
Since 1936 Sutter has blasted out stumps on farms all over the northwest. The usual program of owners of cut-over lands is to work at clearing at odd times. They hire Fred as long as they can afford him to blast out a patch of stumps, then perform the tedious task of piling and burning.

"You have to play this stump blasting partly by ear," Fred Sutter explained. "It depends on the type of soil, moisture in the ground, the degree of stump deterioration, the kind and size of stump. Douglas-fir is tougher than cedar or pine. We also consider what we want to do with the stump. If a farmer has a bulldozer he wants the stump cracked open and the roots busted loose enough so he can push them out. It takes less powder. But if a farmer working with small equipment wants the stump really shook out of the ground and broken up so he can handle it, we use more powder and set the charge differently.

"A good rule of thumb is to use five sticks of 20 per cent stump blasting powder per foot of stump diameter at the base, not the top." Sutter demonstrated by measuring the width across the top of a stump with a tape, then at the base to show how the tree tapers and is much wider at ground level. "This is enough force to crack open the stump and usually bust it up fairly well and blows a good sized hole in the ground. To get the best results the blasting powder must be placed under the stump and just past the center. The soft spot is always toward the hole made to put the powder in, so if the powder is put well under the stump and the hole filled and tamped in tight, the blast will have more effect. Powder explosions exert equal force in all directions, so we can place powder to crack one side,

(*Continued on page* 81)

The stump-splintering blast (above) which can be heard half-way across the county requires more powder than one which merely shakes the stump loose for bulldozing. It can also do a lot more unintended damage. One of Hooker's big crawlers (right) rolls a giant root toward the mountain of debris that will be burned. Chips turn up in the soil for years afterward.



# Grain in the Bank

**Manager Bill Henebry samples a load of oats delivered to his Monticello, Illinois, elevator. Ground and mixed with supplement this grain will be returned to the farmer as needed throughout the year.**

## Corn Belt farmers are by-passing their own cribs and bins to store their grains in the local elevator. Here's how the idea works.

"I'M LAZY, so that was right up my line," said Noble Lowery, eastern Illinois cattle and hog feeder, when asked recently how he happened to enter into a grain bank deal with his local elevator.

Good humored, loquacious and busy as a squirrel at nut time, Lowery is still on the short side of 40. Yet his experience on and off the farm is equal to that of any two or three average stockmen. He farms the 225-acre home place near Kansas, Illinois, together with an additional 170 acres of rented land. He left the farm for a spell in his youth, worked himself up to a foreman in one of the big steel mills in the Chicago area. The land kept calling him, though, and eventually he came back to the country which, he says, "has a lot to offer besides the money." He feeds about 600 hogs a year, about 30 to 40 head of cattle.

As a representative of farm organizations he has made numerous trips to Washington and will give his opinions on the farmers' problems at the sight of a receptive ear. Regardless of the soundness of his political opinions one fact stands out—he has solved his storage problems and his solution is one to which increasing numbers of Corn Belt livestock feeders are being attracted. It is the grain bank idea.

Instead of putting feed grains in farm bins and cribs at harvest time, the grower takes them, or a significant portion of them, directly to the local elevator where he deposits them for safekeeping until such time as they are needed for feeding. Then, he has them ground and mixed with protein supplement at the elevator and hauls the mixed feed back to his stock.

No one is taking the credit for having originated this plan, it seems to have grown spontaneously. As Lowery points out, "A few years ago I put my corn into an old broomcorn crib I had on the back of the place. Then bad weather set in. Some of the corn had been high in moisture and froze and I had one heck of a time getting that corn out of there every time I needed to have some ground for feed. I finally got in there one day when the ground was firm and hauled about a thousand bushels over to Tubby Rardin's elevator at Kansas and parked it there to pick up as I needed it. Tubby didn't charge me anything for the storage since I was buying his supplements and using his grinding and mixing service. Matter of fact, I think he was kind of glad to know he had me for a steady customer and it all worked out fine."

And that is the way the plan seems to have evolved everywhere. It is what might be called the typical bank history. After all, the very term "bank" grew out of the Italian word "banca" from the habit of wealthy merchants of the Middle Ages leaving their gold and silver with the local goldsmith who worked from his "banca" or bench. This custom eventually grew into the banking institution. Now grain growers are following suit. The whole idea has implications of new departures in commodity money standards and credit facilities.

While this is no place to go into the philosophic and economic ramifications of such a thought, it is worth pointing to Lowery's attitude which is undoubtedly a reflection of many other farmers who are using this system. "Tubby doesn't bill me for any of the feed he sells me until after I sell my hogs," he says. "But after all, with maybe 6000 bushels of my corn on hand you might say he has close to $7000 of my money. He gets the use of it and he has good security."

That, of course, is probably an oversimplification of the grain bank principle but it shows the trend of thinking. Tubby himself, H. P. Rardin, to be more formal, owner-operator of the federally licensed Rardin Grain Company, is in agreement with a growing number of elevator men who see the principle as an answer to vertical integration or contract farming.

### A Co-op

Rardin's is a privately owned business. Cooperatives, too, are in on the plan. Under the management of Bill Henebry, a slender, quick-moving, ex-high school teacher and athletic coach, The Monticello Grain Company, a co-op at Monticello, Illinois, has moved into the grain bank in a big way in the last five years.

"Not that the idea hasn't been with us much longer than that," Henebry hastens to explain. "This elevator has been storing feed grains for farmers for 20 years or more. We're going to see lots more of it, too, in the immediate future."

His prediction is based upon two factors —increased crop yields and the advent of the picker-sheller. "Yields are increasing every year," he says, "and there is no sign that we are anywhere near the limit. Even last year, which was notorious for its excessive rainfall around here, our growers were turning in 58 bushel wheat yields, 77 bushels of oats to the acre, and 100 bushel corn. They don't have the storage space to hold all that. They can either build more space or haul the grain in here. They are finding the latter course much easier management-wise and safer. A farmer who has 5000 bushels of storage space, for example, will come up with a 6000 bushel crop and ask us to hold the additional 1000 for him. There are many of them in that fix.

"Then, the picker-shellers and high moisture grain go hand in hand. Drying grain is one of those specialty operations many farmers find they can't do well for themselves. They can very easily damage a few batches before they get the hang of it each year and that puts a large dent in the efficiency of their operation.

"We put a new dryer in here Thanksgiving week of the fall of '57 and handled 100,000 bushels of corn that week. One day there were 14 picker-sheller operators feeding us corn. That's the kind of farming that insures the future of the grain banks."

The arrangements on which the grain banks operate vary, of course, but the rates and terms prevailing at the Monticello elevator are quite typical of many of them.

The crops received for the bank are primarily oats and corn. If the grower uses the grinding and mixing services offered by the elevator and takes the grain back supplemented by their concentrates no charge is made for storage. Otherwise the charge is 1½ cents per bushel per month on the month-end balance.

### Rates

On drying corn the charge is a minimum of 6 cents per bushel for grain up to 20 per cent moisture content. An additional ¼ cent is charged for each ½ per cent moisture over 20. The corn is dried down to 13.5 per cent moisture before it is put in storage.

The charge for grinding is 15 cents per hundred pounds.

Being a federally licensed warehouse the Monticello elevator is required to keep on hand sufficient grain to cover its liability to all the farmers who are using its storage facilities. In other words, if 10 farmers delivered 50,000 bushels of corn for storage, the elevator must be able to show 50,000 bushels of corn at all times, less, of course, that which has been withdrawn by its owners. This demands considerable storage space. Monticello now has facilities for handling 830,000 bushels.

Henebry points out that their elevator stands the shrinkage on the grains while in storage, a loss which he says consistently runs one per cent in a feeding year. He cautions other elevators which are considering grain banking to be sure to consider this factor when fixing their rates.

Only by chance would a farmer ever get back the same grain he put into the bank. But he is guaranteed grain of like grade and quality. Noble Lowery points out it is not too hard for a farmer to protect himself on this point. "First of all," he says, "you'd never want to deal with an elevator or with a man you didn't trust. If he started giving you the sweepings you'd really be taken. But the best check a man has on the quality of the grain he is getting is just to watch how much feed his hogs or cattle eat. I've been feeding hogs long enough to know how much a bunch should clean up in a day. If they go to eating more than that and show nothing for it I know I've been gypped. But that's never happened to me yet."

### Accounting System

Fortunately, the Department of Agriculture does not require the issuance of warehouse receipts on the grain in the bank. Such a procedure would complicate matters considerably. If a farmer had to bring his receipt with him to have it voided and reissued every time he wanted feed, the plan would soon lose its popularity

But a detailed accounting system is essential. When a farmer phones the Monticello mill to order a batch of feed mixed, a mixing slip is made out which shows exactly how many pounds of each ingredient—corn, oats, bran, oil meal, molasses, salt, etc.—is to go into the mixture. This slip is sent to the mill where the processing is started.

A bill is made up charging the customer for the purchased additives and showing how much of his own grains have been used.

On a special bookkeeping machine designed by the National Cash Register Company the bookkeeper maintains a daily balance of each customer's account

(*Continued on page* 119)

**A fool-proof accounting system is the heart of any grain bank. This machine was especially designed for the work. Noble Lowery (right) checking a feeder in his hog lot, stores his home-grown grains at his local elevator, phones when he needs a batch of feed.**

# Fresh Air Indoors

By George Laycock

VENTILATION PROBLEMS are common enough with livestock buildings but sometimes they'll crop up where you least expect them. Some months ago Herb Merton, an eastern Indiana corn and hog farmer, erected a new metal building to house machinery. He never gave ventilation a second thought. Idle machinery gives off neither heat nor water vapor.

But it wasn't long before Herb knew he had troubles. Heavy rains had delayed erection of the building. As soon as they stopped, Herb hauled in some gravel and leveled it over the building site. Then he put the building up, a task that took only a few days, filled it with machinery, closed it up tight and relaxed in the belief that his machinery was housed better than ever before.

Beneath the gravel was a virtual lake. Water vapors filtered up through the gravel and saturated the air inside the building. During the cold rainy spell Herb went into his new shed and found water dripping from walls, ceiling and machinery. His machinery wouldn't have been much wetter out in the rain.

A few minutes later Herb, not in the best of moods by now, was talking on the phone with the dealer who sold him the building. The first thing to do, said the dealer, was to drain around the building to keep water from collecting beneath the gravel floor. It was too late now to install a vapor barrier, although Herb admitted that if he had the job to do again he would certainly put polyethylene plastic beneath the gravel.

The next step after draining the site, said his dealer, was to leave doors and windows open on warm days and leave windows partly open at all times. This would provide air intakes and move air through the building to the roof ventilators. The air currents would help move off vapor-laden air.

Merton followed these suggestions and his machinery storage is now dry regardless of changes in the weather.

The most common ventilation problems come with livestock housing. Animals give off heat and vapor. The warm air inside a poorly ventilated building can hold more moisture as vapor than can cold air. When this warm, moisture-saturated air touches the cold surface of the building the vapor begins to condense into drops of water. You see them clinging to the surfaces inside the building. Sometimes, on cool, moist mornings, water will even drip from the rafters of a poorly ventilated barn onto the stock.

Ventilation moves this moisture-laden air out of the building and brings in fresh, cool air. Condensation, like pain, is a warning. When you see it you know your building needs either better ventilation or better insulation, or both.

Farm operators have begun to realize in recent years that ventilation problems are more common than they once thought. The rise of the southern broiler industry has pointed this fact up in that region. Prolonged high temperatures in recent summers brought high losses among broilers. Ventilation is an important aid in temperature control. With broiler men giving increasing thought to ventilation problems, other livestock men have realized they are faced with similar situations.

Modern metal buildings don't absorb part of the moisture as did wooden and masonry structures. Condensing moisture stands out like beads of dew or gleaming frost and there's no overlooking it.

### Open Up

The most serious ventilation problems in northern climates come in winter. It may take will power to open a warm barn on a winter day and let in fresh, cold air. One southern Ohio hog farmer converted the farrowing house on his tenant's place into a hog-feeding barn. The uninsulated building warmed up fine, according to the tenant, but the owner began to realize every time he went in the barn that moisture was condensing on walls and windows. The answer, he knew, lay in getting air moving through the building. He had some new air intake doors added to the building and installed more roof ventilators. This worked fine as long as the intakes were open but no sooner was the owner gone than the tenant closed up the building to keep it warm.

The farm owner finally solved the problem when he installed some louvers in the barn, louvers that could be neither opened nor closed. "This frustrated the tenant," he said, "but the hogs liked it real well."

A good ventilating system does three things. First it brings fresh, cool air into the building from outside. It uses heat given off by animals to warm this air so it will hold more moisture. Then it carries the warmed air out of the building either by natural circulation or by mechanical means. This controls air movement, moisture, temperature, and odors.

The first and most important reason for ventilation is the good health and productivity of stock and poultry. Dairymen who have installed ventilating systems in their barns have noticed that they have fewer cases of mastitis, stiff joints and pneumonia. This actually means more milk sent to the plant. Professor King at the University of Wisconsin's Experiment Station discovered, as early as the 1890's, that cows housed in well-ventilated buildings produced five per cent more milk than when they were kept in tight, unventilated buildings.

Good ventilation helps control respiratory diseases and this is especially important in hog, poultry and dairy enterprises.

Meanwhile the ventilating system is helping control odors and dust. Ammonia odors from poultry litter are moved out of the building and so are milking barn odors that

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## Fresh Air Indoors

Ventilation is as important to a building as a good roof. The increased use of metal buildings has proven this beyond all doubt. The older, more loosely constructed wood buildings either allowed much of the moisture-laden, stale air to escape or the moisture was absorbed into the wood causing rot and deterioration. With metal structures the condensation is apparent and demands immediate attention.

In livestock shelters, good ventilation brings fresh air into the building; uses the animal heat to warm the air so it will hold more moisture; then carries the warmed air out either by natural circulation or by mechanical means.

Animals give off surprisingly large amounts of water. A cow, for example, breathes more than 2 gallons of water into the air every 24 hours. Even "dry" materials, such as lumber stored in a buildings, can be sources of water vapors.

Ventilators should provide at least one square foot of roof opening for every 400 square feet of floor space in livestock buildings. A fan of 1600 cu. ft. per minute capacity will provide fresh air for 13 dairy cows, 400 layers, 100 feeder hogs.

**The ridge of the roof is the best place for ventilators. The warmer air rises to that point and is carried away as the cooler, fresh air enters the lower parts of the building. Roger Rosselot, a young Ohio farmer (left), installs one of a series of ridge ventilators on an all-metal cattle shed.**

might get into the milk and flavor it.

High summer temperature is another good reason for checking the ventilation system to see that it is adequate for the job. "Animals produce much less efficiently when temperatures go above 80 degrees," Don Richter, who heads up Armco Steel's Farm Building Sales Department, said recently. "A few more degrees at this point," he added, "make a big difference in feeding efficiency and, of course, in profits."

For summer ventilation more than twice the fan capacity is required as is necessary for winter ventilation. In dairy barns, for example, six air changes per hour are ample in winter while 12 air changes are necessary in warm weather.

But moisture removal is the most important job of a winter ventilation system. There are several sound reasons for keeping the inside of the farm structures dry. Damp walls and ceilings collect dirt and make it more difficult to keep the building sanitary. High humidity makes poor working conditions. The excess water in poorly ventilated buildings causes rot and rust and shortens the building's life.

Part of moisture control in a building is knowing the sources of water vapor in it. In most farm structures it is livestock. A dairy cow breathes into the air more than two gallons of water every 24 hours. A 200-pound hog gives off nearly a half gallon of water a day. Even a flock of 250 layers add three gallons of water a day to the air.

Meanwhile urine and manure, as well as deep litter and manure packs, are adding more water vapors to the air. Those wet floors in milking parlors, milk houses and hog-feeding houses help saturate the air with still more moisture.

"Sometimes," Richter said, "vapor can filter up through the floor whether it's gravel or concrete. It moves more slowly through concrete than through gravel. Wet concrete gives off large quantities of moisture until the concrete has cured."

Heaters without smoke flues to the outside also release moisture into the air when fuels are burned. The combustion releases carbon dioxide and water.

Materials, even "dry" materials, stored in a building can be unsuspected sources of water vapors. One farm operator in southern Wisconsin stored lumber in a tight metal building. Within a few days the building was dripping wet on the inside. The trouble lay partly in the lumber and partly in the ventilation system. The lumber was still green and giving off water. The building had no roof ventilators and its single door and two small windows were tightly closed. The cure was simple, the installation of ridge ventilators and a few sidewall louvers moved the moist air out of the building.

Ventilation problems in livestock shelters have been partly responsible for the trend toward more mechanical barn cleaners. Poultry growers are installing dropping pits with cleaners. Hog producers are adding such equipment as mechanical cleaners and floor drains which empty into liquid manure pits. The less moisture the less severe the ventilation problem.

No one can offer one simple solution to all ventilation problems any more than a doctor can safely prescribe a single treatment for all human ills. All manner of variables complicate the picture. Climate makes a difference as does topography, building use, type of construction, degree of insulation and type of floor, to name a few.

But the first point to consider in determining how to ventilate is whether or not the building is insulated. Ventilation of tight, insulated buildings has been reduced to principles on which there is general agreement. It's simple enough to figure the proper combination of fans and other equipment for an insulated farm structure and we can return to this point shortly. How to ventilate uninsulated buildings, however, is a barn of a different color.

In most uninsulated buildings warmth is not a critical problem. Even in the coldest winter weather feeder cattle shelters need not be much warmer than the outside temperatures. What the cattle need most is freedom from wind and drafts and a place where they can get out of the snow.

### Uninsulated Buildings

Actually the rules for ventilating uninsulated livestock shelters are simple. Keep one side of the building open where practical. Keep dry litter in the barn. Install plenty of ridge ventilators and gable louvers. And don't try to close the building up tight in cold weather. For cattle and sheep, especially, you can leave a whole side of the building open. They can stand far colder temperatures than humans, so don't judge their needs by your own comfort.

In summer, open two opposite sides of the building where practical. A reflective roof, whether it is white paint or aluminum coating, helps reflect the sun's heat.

"There are some additional rules," Don Richter said, "for properly ventilating buildings used for dry occupancy such as machine shops, garages, and dry crop storage." Here it is important that floors be dry and that water is drained away from the foundation. These buildings should always have ridge ventilators; and to let fresh air in there should be air intakes at doors, windows and louvers. Keep the building open while concrete floors are curing. If the building has space heaters be sure they are vented. Finally, check for moisture that may evaporate from stored products.

Dry-occupancy buildings may need additional ventilation in summer, especially if you work inside the building. During the hot months provide for as much cross ventilation as possible. A reflective roof keeps the interior more comfortable.

Summertime ventilation of livestock shelters is important enough to stand a closer look. Temperatures above 60 degrees drop production efficiency for most animals including poultry. If temperatures rise to 100 degrees and stay there chickens begin to die and livestock go off feed.

Try for the maximum amount of cross ventilation. Leave the largest openings you can on both leeward and windward sides of the building. This does two things, both of them good for livestock. First it keeps air temperatures inside and outside the building about the same. Meanwhile, it keeps air velocity past the animals at a maximum so they get the same good feeling as grandma does fanning herself. Researchers at the California Agricultural Experiment Station have found that air speed increases of a few miles an hour offer as much benefit as lowering the temperature a few degrees. With the proper cross ventilation the building is changed into a large shade.

Insulated poultry buildings sometimes hold their heat too well and keep temperatures dangerously high on summer nights while uninsulated buildings are cooling off. Here the answer lies in systems of fans with adequate capacity to move the hot air out.

Southern broiler producers learned the expensive way during recent summers which brought prolonged high temperatures even for the South. Chickens could tolerate the hot days better providing the air cooled off at night. And it did cool off in the buildings which could be opened up. The tightly closed, insulated houses held their high temperatures for days at a time and left dead birds scattered like candy wrappers on the county fair grounds.

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Hugh Pinkerton uses a smoke bomb (above) to check the upward course of the air currents in his combination grain and machinery storage building. Windows, doors and ventilators (left) help keep the air moving through this building. Even in the open-sided shed he uses for his hogs, Pinkerton increases the air flow with louvers in the side walls and ventilators on the ridge.

# Sheepmen and the Market

## Buyers and sellers on a terminal market tell why the sheep business is in the doldrums.

As THE MARKETMEN sat around the hot stoves in the shacks of the Chicago Stock Yards last winter, they sang an old familiar song, "Times are hard and getting harder." That's the way it's always been with sheepmen, and for that matter with cattlemen and hogmen. Prices are never what you would like them to be, and you're losing money—everybody is losing money. There's never a bright day but what it could be brighter.

The little shacks, shanties and sheds in the stockyards, jerry built, scattered here and there among the pens and alleys, are offices and harbors of refuge for the marketmen. An established man in the yards will have a shack of his own, a two-by-four affair with a small heater, a desk of sorts, a telephone, and a chair or two; the larger structures, the check-in shacks and the scale sheds, serve as clubhouses as well as business establishments for the men who do business there. In the big check-in shack in the sheep yards is a gas stove with its inevitable pot of coffee. The first arrival in the morning, maybe as early as 5:30, puts it on. On the littered table is an assortment of leftovers of snacks, half-eaten doughnuts, odds and ends of loaf and loose sugar, and a broken package of cookies. The cups are sometimes washed at a tap in the corner; the spoons are never washed.

The shacks are always hot—hot in summer from the muggy, oppressive heat of Chicago—hot in winter from the red-hot stove. The floor is covered with gunk from the pens—if it gets too bad, it's shoveled out. The smell of the pens permeates everything. The windows and doors are kept tightly closed, but the smell is there, augmented by the assorted fragrances of the shack. No one minds this. If you mention it they look at you innocently and ask, "What smell?" Or they may blame it on the hog or the beef pens, from whence emanate smells that a sheepman positively cannot tolerate.

In these shacks gather a distinct race of men. They are dressed for the most part in a sort of semi-official uniform—khaki pants and shirts, either a cap or a hat, mostly caps, with the inevitable "boots" which are not boots at all but old-fashioned buckle overshoes. On cold days each is fortified by several layers of sweaters.

As a group these men are among the shrewdest traders in the world. Their methods reflect their personalities—the soft sell,

Aubrey Williams (left), buyer for a group of eastern packers, has spent a lifetime on the Chicago market. Tom Lynch, a buyer, and Wally Desmond, a commissionman (below), look over a bunch of early spring lambs at the Chicago Stock Yards.

the high pressure, the innocent approach, the confidential aside. There is one principle they have all learned well—honesty is the only policy over the long haul.

As they gather in the early dawn of a market day, they are turning over in their minds, sorting out and correlating a mass of information and reports on which will be based prices for the day. The press, the Livestock Exchanges, the government wires, and private informants all contribute information and data. Before the commissionmen and buyers go to the yards in the morning, they drop in at the exchange and take a close look at the bulletin board. On this board are posted the receipts, sales and prices for other markets and the prices paid by the dressed trade. The so-called "river markets"—Omaha, Kansas City, East St. Louis, Sioux City and St. Joseph—have an important influence on sheep markets elsewhere. If receipts at the river markets are light, and closing prices were up, this is a cue for the Chicago marketmen to edge up the prices that day in Chicago.

They take a look at the general run for the day, then a closer and more speculative look at the animals they may buy or sell. Sooner or later they meet in the big shack for coffee, and the inevitable sparring between buyer and seller.

In the first months of 1959 they may have been reluctant in some matters, but they were outspoken and positive about one thing—the sheep market was in a bad way. Lambs had been a not too displeasing $24 in the fall of 1958 but had slipped in early winter and by late February were down to $18.50. This big decline did not follow the normal trend. The drop started earlier than usual, and continued into the New Year, when most expected a rise. Some blamed it on over-supply, some on the weather, some on the wool market, some on the failure of the big chain stores to feature lamb. Many feeders swore over and over again they would never look another sheep in the eye as long as they lived.

To Aubrey Williams, Chicago-based order buyer for a dozen eastern packers, the situation was, as the Irish say, "hopeless but not serious." His clients like low prices, but Aubrey, a studious, thoughtful man with the air of a seasoned college professor, is a keen student of the sheep industry, and he doesn't like an unhealthy situation in any part of it.

If you ask Aubrey why the doldrums in the sheep business he will tell you, "There aren't enough people eating lamb. The biggest demand is in the East, where there is a high percentage of people with eating habits acquired in the old country. Fully half the lambs sold here on the Chicago market are shipped alive by truck or rail to eastern packers. Our biggest customers in the East are the Jews, Italians, Greeks and Syrians. Much of the lamb I send East is koshered.

"To the average housewife, lamb is a special dish and she wants either a leg or chops. The fore quarters, which make the finest roasts and stews in the world, go begging. The American Lamb Feeders Association of Denver has been carrying on an 'Eat More Lamb' campaign and this has done some good in popularizing lamb. The Association has also been trying to buck the trend to synthetic fabrics and focus attention on the superior virtues of wool.

"Lamb feeders ought to know that sending us heavy lambs is cutting off their own noses. A housewife wants a 5 to 6-pound leg, about the average for an 80-pound lamb. When you get up to 100 to 120-pound lambs the legs run too heavy. But, the feeder reasons this way—'I buy a 75-pound feeder and I pay 24 cents for him. I have to put at least 30 pounds on him to make any money.' So he's caught in a trap—the heavier the lamb the less desirable he is on the butcher's block, but the more profit he makes for the feeder. The weight of lambs has been crawling up for a number of years. We used to get lambs of around 80 to 90 pounds—now they go 100 to 120.

"The price of lamb in competition with beef and pork is a happy situation about which the housewife is ignorant. Back in January you could buy a leg of lamb in Chicago for 50 cents a pound. You couldn't buy a pork or beef roast for that, and lamb is a lot better eating." Aubrey was tired and there was a hungry glint in his eye. "We are lamb eaters at home," he added, "because lamb is the best meat in the world."

The price of wool and lamb pelts has a great deal to do with the price of lambs.

"Wool last year got as high as 52 cents a pound—it's down now to 29 cents," Aubrey said, with a sad note in his voice. "That really takes $2 off what they get for a lamb. Then the lamb pelt—last year the pelt market reversed itself and went crazy. In a normal year pelts will be, say, $3 in November, go up to $3.50 in December, and to $4 in January. This season the price started to drop in December and by March it was down to a measly $2.65. I've been 52 years in these yards and I've never seen anything like it. Casings, too, which are relatively unimportant in price setting, dropped from 46 cents a year ago to 25 cents now. That's what synthetics have done to the casing market. Synthetic casings are not new, and the prices have been dropping slowly; last year there was a big drop in all packinghouse products and an over-supply of lambs.

"The subsidy on wool and lambs, commonly called the incentive payment, is a complex gimmick, made complex by governmental red tape. Briefly, a wool producer who qualifies for the payment receives a subsidy based on the difference between what he receives for his wool and the support price. The lamb producer is paid a subsidy on the number of lambs he produces, and the feeder gets a percentage of the gain he puts on a lamb. Because of the inequalities in the administration of the incentive regulations, no one can figure out what he will get or what he should get. Most sheepmen count little on the subsidy in their over-all management. The 'eat more lamb' and 'wear more wool' promotion is financed from incentive payments.

"The packers I buy for are not happy, either, about lamb prices. When there are low prices at one end, the other end hurts, too. I'm shipping a carload of lambs today. I bought them at $19.75. Add $1.40 for shipping East, you have a cost of $21.15. The packer takes off $3 for the pelt, which

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# solid irrigation

SKILLFUL AND IMAGINATIVE California farmers have developed a new sprinkler irrigation technique. They call it solid irrigation. By quadrupling their lateral lines they have taken one more step toward the ideal for their potato crop: light, foggy rain whenever the crop needs it. They have also cut their labor costs and substantially improved quality and yield. A sharp increase in investment was needed to do this.

Solid irrigation differs from conventional sprinkler irrigation in the number of lateral lines used. Instead of using only enough pipe to sprinkle a limited area and then moving them down the main line, enough laterals are provided to cover the entire field to be irrigated. The laterals are placed semi-permanently in the field and the water is shifted from one line to another by opening and closing valves. And even this act is being automated.

One of the first farm operators to use this system, Orvin Mettler of Bakersfield, California, is quick to warn this system takes careful engineering. After five years experience with solid irrigation Mettler said, "It should be tried experimentally on a very limited acreage. That's what we have done. Different soil types, slopes, and wind factors all influence the design of the system. It takes engineering, research, and practice to find out how you are going to have to do it on your own farm."

The Mettler layouts are typical of what it takes to set up a solid system. Quarter-mile lateral lines rib the potato fields taking off at 40-foot intervals with sprinklers. The sprinkler has a 5/32-inch orifice. Water is pumped through the system at 50 pounds pressure to form an overlapping pattern.

Each main line is an independent system, getting its water from either a well or a reservoir. In either case, the water is pumped through the system by a separate pump. A deep well pump designed to deliver low-pressure water for furrow irrigation and at another time high pressures for sprinklers would not be efficient.

### Operation

So far, solid irrigation has been used almost exclusively on potatoes in California. The system is set up on the Mettler Farms as soon as the crop is planted. "Knowing we will have a problem with cultivation," Orvin Mettler said, "we deliberately put the laterals in the wrong rows as a temporary measure for the first irrigation. Then after we cultivate, we shift the laterals three or four rows over to where we want them for the season. We do this by inserting a short section in the main line and shifting the whole system like you would a football team. Once in this position the pipe is not moved again until it is hauled out of the field at harvest time."

When the system is first started, the end plugs are left out of each lateral and the line flushed clean. Screens at the pump and in the main line prevent dirt getting to the sprinkler head and clogging it. Once the system is started it is rare for the irrigator to have to slog into the field.

His job is along the sidelines, turning on and shutting off the water. It is well he doesn't have to go through the fields for most of his work is done at night.

"When we started using a solid system, we were running all hours of the day. We got that out of our heads in a hurry," Orvin Mettler said, "when we found out how much distortion we were getting in our sprinkler pattern. Wind blowing the water off the planned pattern and leaving bare ground is much more critical with a solid system than with movable pipe. When you move pipe you would normally compensate for a little wind distortion by laying your pipe halfway between your old lateral location the next time you make a round. You don't get that chance with a solid system. And if you try to compensate by a heavier irrigation next time you run those laterals, you usually wind up overwatering. We woke up to the fact that the only time you can use this solid system is when the air is completely still. This is usually at night."

During irrigation, water is kept moving down six laterals on each main. A three-hour sprinkling puts around ¾ of an inch of water onto the hills of potatoes.

On calm days the system may be run day and night. Since this would require more water than the deep well pump can normally deliver, a large reservoir is built to hold extra water for just such opportunities. When the system is not being run during the day, the pump fills this storage pond.

At the end of the growing season the pipe is pulled out of the field. It is then transferred to other land, for here they raise two potato crops a year and get double use out of their irrigation equipment.

The job of setting and pulling out a

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## solid irrigation

California farmers are laying lateral sprinkler pipe in a solid pattern over their potato fields. With laterals at 40-foot intervals down the main, they never move pipe once it is set in place. The cost runs from $400 to $800 an acre as compared to around $100 for the conventional system with movable laterals. The savings are in labor, yield and quality, and water economy. Labor costs $50 an acre to irrigate with movable pipe; it costs $7.50 to $10 to lay down a solid system and one man can irrigate 160 acres instead of the 40 he covered with movable pipe. Yields and quality are both improved. Each main line has its own pump which draws water from a reservoir (above) a lovely place for the kids to swim. Most irrigating is done at night when there are no winds—a solid system must have still air for good coverage. The newest addition to solid irrigation is a combination of timer and valves which will permit almost completely automatic irrigation. Solid irrigation is limited to areas where irrigation supplies practically all of the water. Its major drawbacks are its initial cost and the difficulty of maintaining a sprinkler pattern in a wind.

# pump-plant test

WHETHER AN IRRIGATION pump runs now and then, or night and day, it should be pumping the most water at a given head, for the least fuel possible. This is the measure of its efficiency.

A four-year University of Nebraska survey of 298 deep well turbine pumping plants showed over a third of these plants badly in need of attention. Only one-fourth were operating at or near the University's criteria of performance.

The experiences of three Nebraska farmers are good examples of how performance can be improved. Roy Dean Parker of Benkelman saved $48 for each 1000 hours operation by a carburetor adjustment on his propane-fueled engine. Dale Cambell, Beaver City, was using the same fuel with a low engine compression ratio. Milling 50 thousandths of an inch from the cylinder head and a pump adjustment raised his plant performance efficiency 23 points on the University scale. Lastly, Dale Lingenfelter, of Pierce, saved $14.50 a year in fuel bills, but an adjustment to the pump gave an increase of nearly 300 gallons of water per minute (gpm) from this smaller amount of fuel.

These farmers used the pumping-plant performance test. The University team came to their farm, made certain measurements, applied a simple formula, and arrived at a standard for the well. Then they recommended some adjustments, and after they were made, tested again.

The measurements made in the performance test are the amount of water pumped, the total lift, and the fuel (or energy with electricity). These figures are put into a formula to give the "water-horsepower" (whp)—a unit of work done. Then, the gallons of fuel (or energy unit) is divided into the whp to determine how many whp-hours per gallon were obtained from the fuel used. If the calculations indicate the water horsepower hours per gallon or unit of energy obtained in the field were less than those of the standard for deep well turbine pumping plants (worked out by the Agricultural Engineers at Nebraska) they are correspondingly less efficient.

The test uses these measurements:
(1) Depth to the water surface when pump is operating and water level is stabilized.
(2) The pressure on the discharge side of the pump—needed to operate sprinklers, or to overcome extra height of pipes above the ground, or losses in pipes or gated systems. One pound pressure is the same as 2.31 feet "lift." These first two figures, added together and expressed in feet, are the "lift."
(3) The fuel used per hour—natural gas, propane, diesel, electricity, or gasoline.
(4) The amount of water discharged in gallons per minute (gpm).
(5) The speed of the pump and engine, in revolutions per minute (rpm). This is needed only to check the pump and engine.

These figures are combined into the formula:

$$\text{water horsepower (whp)} = \frac{\text{Lift (in feet)} \times \text{gpm}}{3960}$$

The number 3960 is a standard factor which has been computed—rather like dividing feet by 12 to get inches.

The next step is to measure the fuel or energy per hour used by the pumping plant, by weighing liquid fuels or using meters on electrical or natural gas installations. Then the whp-hours per gallon (or unit of electricity) can be calculated:

$$\text{whp hours per gallon} = \frac{\text{whp}}{\text{actual gallons of fuel used per hour (or units of electricity)}}$$

Then consult the table below from the Nebraska Experiment Station Quarterly. This gives the *standard* water horsepower hours per unit of fuel or electricity.

| *Energy Source* | *Standard water horsepower hours* |
|---|---|
| Diesel | 11.06 per gallon |
| Gasoline | 8.48 " " |
| Tractor Fuel | 8.31 " " |
| Propane | 6.69 " " |
| Natural Gas | 66.4 per 1,000 cu. ft. |
| Electricity | 0.885 per kilowatt hr. |

These figures are based on a 75 per cent pump efficiency and 5 per cent drive loss. In the case of electricity, they assume a direct drive between motor and pump and an 88 per cent efficiency for electric motors.

Now the performance standard can be calculated, rated on a scale of 100:

$$\text{Performance rating} = \frac{\text{whp-hrs. per gal. (field calculation)} \times 100}{\text{whp-hrs. per gal. (from standards)}}$$

High performance comes from the proper selection of bowls, drive shaft and power unit, adapted to the characteristics of the well. Also, higher performance comes with larger quantities of water pumped. The

(*Continued on page* 123)

## pump-plant test

For the last four years, the University of Nebraska has conducted tests of the performance of deep well turbine pumps in Nebraska. They have set up a performance standard, based on an average overall efficiency, and judged farm pumping plants on a scale according to this standard. In more than half the plants tested, performance could be improved by adjustments to the pump or power unit. The most common faults at the engine were carburetor or timing problems (or injector troubles with diesels); and in the drive, belts were often at fault. A common adjustment necessary was the clearance of the pump impellers from the impeller seat. None of the adjustments should be attempted by a non-skilled person. Many pump manufacturers and operators use the overall efficiency of the unit as a scale, and this results in a lower figure—although the same measurements are made to obtain it. (They both serve the same purpose, like temperature Fahrenheit and temperature Centigrade.) Whatever the scale used, some kind of test is a vital part of irrigation procedure, for any kind of pump. Whether the overall efficiency or the Nebraska performance standard is arrived at, a test will show an operator if he is wasting money.

# They Can't Block You Off

By Charles Straub

IMAGINE STARTING down your drive some morning and finding it closed by a taut, new fence! Somewhere along that fence would be a boldly-lettered sign reading:

NOTICE
This highway has been designated as a
LIMITED ACCESS HIGHWAY
Owners of abutting property have no right of entry
except at designated intersections

It couldn't happen to you, you say, because you don't live on such a heavily-traveled road. In that case you might start down that quiet little country road and suddenly come smack up against a hunk of railroad iron blocking further progress at the point where you used to cross the state highway.

This has been going on all over the country the past few years. Actually, it is seldom so abrupt. The property owner is given notice well in advance that he is to lose his access rights. But eventually the barrier goes up and, in most cases, that is the end.

Control, or limitation, of access has been standard practice on many highways for a number of years. But the real push for limited access came with the passage of the Federal Highway Act of 1956. This act guarantees to the states payment from the Federal Treasury of around 90 per cent of the construction cost of the 41,000 miles of the new Interstate Highway System—if those roads are built according to federal specifications. These specifications include limitation of access. To put it bluntly, if crossings or intersections at grade (on the same level) are built on these roads the state gets no financial help from Washington.

No one is going to quarrel with the fact that limited access highways are a real benefit to the individual and the nation. The daily bumper bedlam on our streets and highways is horrible enough at present, with something in the neighborhood of 66 million vehicles competing for space on the pavement. And the congestion is grow-

**Limited access highways are springing up all over the country. The new Interstate System alone (map, upper left) will cover 41,000 miles, access to every foot of which will be strictly controlled. Landowners along these roads are faced with some serious but not insurmountable problems.**

ing. New roads are only part of the solution. Even the finest highway can become obsolete if encroachments spring up along its borders without restriction.

The speed limit on the 30 miles of four-lane highway along California's U. S. 70-99 from Los Angeles to Pomona, for example, had to be reduced to 25 miles per hour within four years after the road was opened, mainly because of lack of access control.

The Boston Post Road from the New York State line to New Haven, Connecticut, is intersected by a private driveway on the average of every 122 feet, has a filling station every 895 feet, eating places every 1,825 feet, other commercial establishments every 427 feet, and is cut by 323 intersections—all this in a distance of less than 50 miles.

From the safety standpoint alone limitation of access seems worth whatever the price may be. A recent Michigan study showed the rate of fatal accidents per million vehicle miles was 3.74 on limited access roads. On highways where there were 4 or more roadside features per 1,000 feet the rate jumped to 13.48.

Traffic accidents in the United States currently involve a loss of more than $1.7 billion per year, exclusive of personal injury and loss of life. If that figure could be cut by 75 per cent, or even halved, the saving would be tremendous.

The time lost in the tie-up of commercial vehicles on inadequate roads is estimated at $1.8 million per year; and the losses in gas, brakes, tires, and so on (every start and stop uses as much rubber as one mile of ordinary travel and enough gasoline to drive two city blocks) is figured at $1.3 million.

Thus, there is no trouble at all in establishing the economic justification of highways which permit the free movement of traffic without interference from intersections and encroachments. And the ease with which any motorist, farmer as well as city man, will be able to drive from coast to coast, from border to border, touching at every state capitol, every principal city in the nation, without ever crossing a single intersection at grade along the 41,000 miles of the new Interstate Highway System caps the arguments for limitation of access.

Yet the greatest part of the burden that goes with the construction and control of these roads invariably falls on the adjacent or nearby landowners, the farmers who find themselves cut off from their regular route to town, from the elevator, the local school and fire protection, whose fields are made inaccessible from the barns and homesite, or who find the value of their land greatly depreciated by the loss of access rights.

Highway officials the country over assure the public that acting within the limits of the law they see to it that every affected landowner is treated fairly, and that construction goes forward with no undue hardship on any individual. And there is no doubt but that in most instances they do their best to follow such a policy. Still, the landowners feel that only they are the real judges of how badly they are hurt.

The questions they are asking today are: What are my rights in this situation? What can the state do by way of providing me with access to the points I must reach? How can I protect myself and see that I get a fair shake?

In an earlier article ("They Can Take It From You", The Farm Quarterly, Summer, 1957) this whole matter of eminent domain and condemnation was discussed in detail. Here, we confine ourselves to access rights. But the basic principles upon which the property owner's rights are established are the same.

The Fifth Amendment of the Constitution of the United States says that no person may "be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation." This is reinforced by the Fourteenth Amendment which places the same limitation upon the individual states.

In some states the compensation is set by a group of commissioners or appraisers whose decision can be challenged by the owner and carried to court if he feels he has been treated unjustly, but nowhere in the United States can the state or federal government simply walk in, appropriate a piece of property, or cut off its access in arbitrary fashion and without making just compensation.

Some states have tried a "one-price policy." This means that the state having determined it needs a particular piece of land for a road or other public improvement offers the owner a certain price which it feels is fair and refuses to negotiate further. Even where this policy is followed, the owner still has the right to refuse the offer and go to court. And the records are full of cases where such owners have improved their position by asserting their rights.

This is generally not a matter of the landowner's filing suit. In most states he merely refuses to sell for the amount offered, then the state condemns the land or the rights it wants and petitions the court, with the aid of a jury to determine "just compensation."

What chance does a man have in court? Martin Hanna, a trial lawyer of Bowling Green, Ohio, who has had wide experience in these cases, sums it up this way, "Everything in the book favors the condemnor in these cases. Everything, that is, but the jury. I'll take the jury." He has a long list of victories to prove his point.

### The Public Hearing

Another protection afforded the owner, though some would deem it very minor, is the public hearing which the federal law requires be held in every community affected by the construction of one of the new Interstate Highways. These hearings must be advertised in advance, so that all affected parties will have the opportunity to learn how the project will touch them and to express whatever objections they may have. Theoretically, strong and valid objections could influence the officials to alter the plans for the right-of-way. This has happened.

The trouble with the public hearing is that very frequently those who will be most affected fail to attend, either through ignorance that the meeting is being held, or through ignorance of the fact that it concerns them. Usually these hearings are in the nature of an unveiling of the plans for the new highway and are the first official word the citizenry receives of the location of the right-of-way. The landowner who simply assumes he is in the clear and looks upon the hearing as a waste of time is in for one of the major shocks of his life when the right-of-way agent drops in a few weeks later asking for his signature on a document conveying the front yard, including grandfather's favorite oak tree, the porch, and 10 feet of the parlor, and cutting off access to the new road.

Basically, this sums up the property owner's rights. The state must first prove that the taking of his property or his access rights is necessary. Then he must be afforded just compensation.

Even in a case where not an inch of land is taken or a single building touched, compensation must be paid to the owner if he loses the right of access from any part of his property to the road.

Take the case of the Ety family at Lancaster, Ohio. (While the cases cited here are from Ohio, and while no two cases are exactly alike, they are all determined on the same basic principles.) Mrs. Ethel Ety and her two sons, Robert and Paul, have a well-improved modern dairy farm of about 300 acres adjacent to the city limits of Lancaster. U. S. Highway 33 traces its way past their place as it proceeds in a northwesterly direction towards Columbus 30 miles away. The Etys are within sight of rapidly growing residential, business and industrial developments. Subdivisions, motels, and shopping centers are all moving their way.

When U. S. 33 was built some years back it cut off a small triangular piece of the farm comprising about two acres. Mr. Ety, who was living at the time, bisected this triangle and gave each of his two daughters, Mrs. Ruth Thimmes and Mrs. Anabelle Schneider, one of the resulting parcels. No improvements were erected on these lots.

Recently the state decided to widen the highway to a four-lane affair and restrict the access. The width of the right-of-way at the Ety farm was sufficient so no new land had to be taken. But access to the triangular parcels was lost completely and the approximately 2,100 feet of frontage of the farm along the highway lost its access rights. Since the homestead and farm buildings are located on a county road to the south of the highway, which road is not to be closed, there was no question of any loss of access from the buildings. But the restriction of access on the portion of the farm bordering the highway greatly depreciated its value for future residential or commercial development and imposed a real hardship on the operators in getting to the fields along that road.

The state, under the one-price system then in effect in Ohio, offered approximately $3,400 for the access rights of the farm, considerably less than $2 per front-foot. Tall, tanned, 30-year-old Bob Ety and his slightly younger but no less vigorous brother, Paul, well aware of the $1,500 plus per acre being fetched by potential subdivision land in their vicinity, were not about to settle for such an offer.

They engaged legal counsel and went to court. The verdict: $12,000 for the access rights, plus a 12-foot gate to permit them to get to the remote fields when necessary.

The whole case, of course, hinged upon what is just compensation for a right which is very difficult to evaluate. Working upon the sound principle that property should be appraised at its highest and best use, the appraisers for the Etys citing the potential use of the land for a supermarket, motel, subdivision, or even an industrial site, established valuations as high as $40,000. But the jury has the final word in these matters and the Etys wound up with a lesser award, but one almost four times the state's offer.

The Ety sisters took their cases to court, too; and here, again, was shown the unpredictableness of a jury. Their land was left without any access whatsoever. In such a case the state must compensate the property owner for the entire value of the piece, though the owner may be allowed to retain title in the hope that he may later be able to negotiate a conveyance to a neighbor.

Both the sisters' parcels were practically identical in topography, location and services; neither had any improvements. Yet in one case the jury made an award of $3,900 and in the other case another jury raised the ante to almost $6,600.

Another interesting case involving access rights and the closing of a township road was the Mel Hulbert affair which was decided by the Ohio Supreme Court last year. Hulbert's farm was located on Township Road 100 on the west side of the new Interstate by-pass just a few miles northwest of Findlay. He farmed not only his own land but also that belonging to R. R. Niekamp to the east of his place.

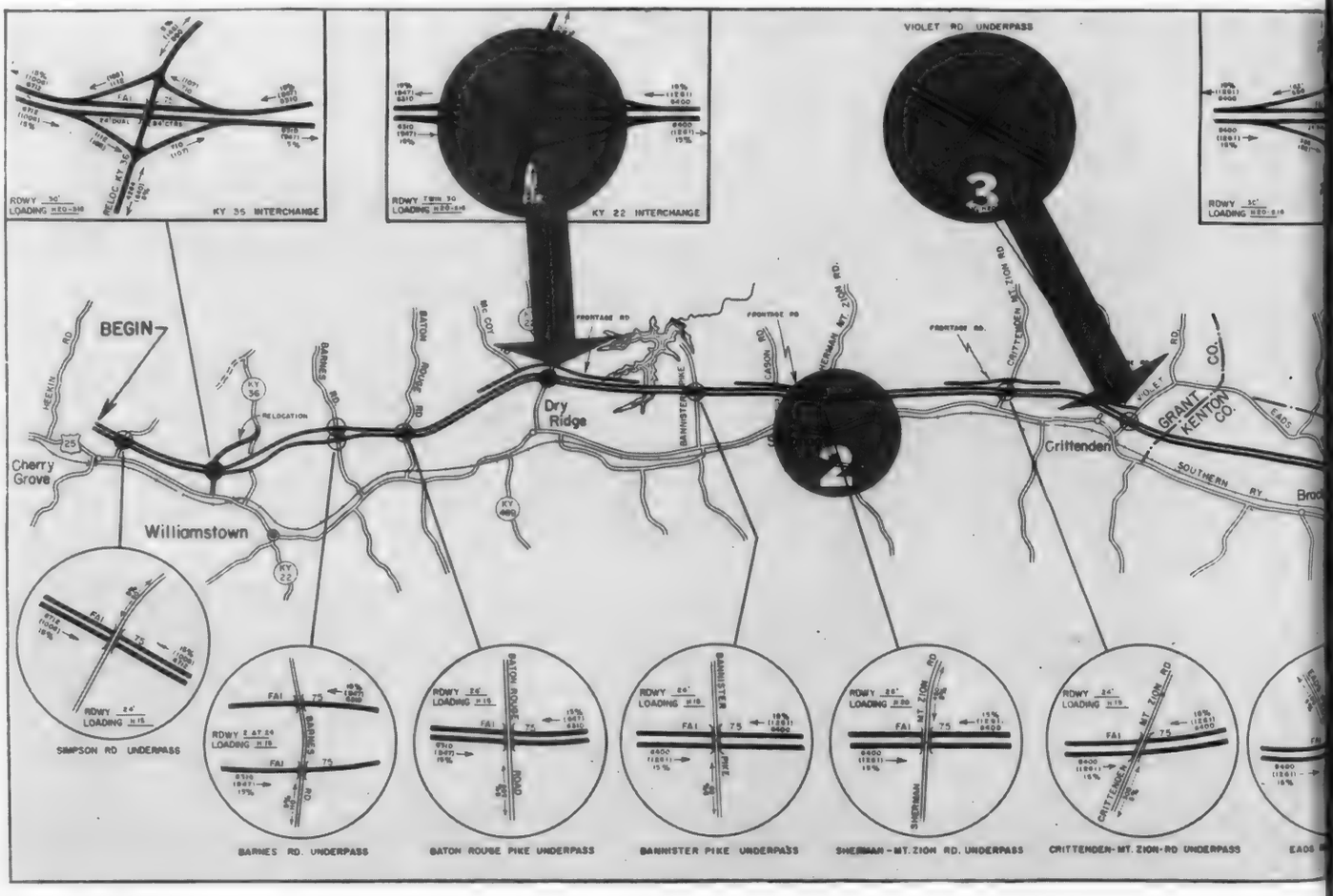
Hulbert attended the public hearings when they were announced, found that the new highway would run north and south right between his farm and the Niekamp place and that Township Road 100 as well as several other township roads and a number of city streets would be closed at their points of intersection with the new thoroughfare. The closing had been ordered by the state highway director in accordance with a policy which had been followed all over the state up to that time.

Hulbert and his neighbors were disturbed. The Kagys and the Phillips, who were also located to the west of the proposed road, would be cut off from the school, from fire protection, they would be forced to follow a circuitous route to the elevator with their grain; to get to Findlay they would have to travel a road subject to impassable snowdrifts in the winter; and Hulbert himself would have to travel almost four miles to work the Niekamp farm which had formerly been just across the fence line.

Niekamp attended the hearings as a committee of one representing the local school board. Two sets of buses seemed the only solution for picking up the children if the roads were blocked.

So the residents of Road 100 and neighboring roads appealed to the county commissioners. Niekamp invited one of the commis-

**Few access problems are exactly alike; yet there are a number of basic solutions. The map below shows how a few of them are being applied along a stretch of the new Interstate Highway between Cincinnati, Ohio, and Lexington, Kentucky. (1) Is a diamond interchange which will permit vehicles to enter or leave the new highway at State Route 22. (2) Shows how Cason Road will be blocked on the west side of the new highway and how a frontage road will be built to give access to the next road to the north which the Interstate will underpass. (3) Is another example of an underpass and of a frontage road designed to serve property owners along a blocked road. (4) Is a railroad underpass. At (5) the state road crosses the new highway on an overpass. And (6) is a modified cloverleaf type of interchange at a point where much heavy traffic is expected.**



sioners to address a mass meeting in the Niekamp yard one summer evening. The commisioner promised he and his colleagues would do everything they could; but the county prosecutor advised them that their hands were tied.

Clyde Warren, one of the commissioners who is also an auctioneer, was accosted by Hulbert at a farm sale about the time the closing was imminent. "He was plenty mad," says Warren. "I told him the best thing he could do would be to get a good attorney."

Findlay is just below Bowling Green, so, inevitably, Hulbert's path led up the broad stairway to the second floor front of the old Masonic Building in that college town where one Mr. Hanna practices law. "Marty told us we'd have a hard time beating the director of highways," Hulbert says, "but he said he'd go along with us if we wanted to crack the whip."

Some 90 citizens had previously signed a petition to keep the roads open. When it came to putting up the money to go to court, only 7 stayed in the game.

Negotiations led to the opening of all the city streets and all but two of the township roads. At this point, Hulbert and his co-petitioners went to court basing their action upon two counts:

(1) The necessity for closing the roads had not been established.

(2) The property owner has title to the land to the center of the road and this property, under the state constitution, cannot be taken from him without compensation.

The court found in favor of the plaintiffs on both these counts. The director of highways took the case to the Court of Appeals, in the meantime starting condemnation proceedings against the plaintiffs, since it had now been decided that even if the roads could be closed the abutting landowners were entitled to compensation.

The Court of Appeals sustained the lower court and added a third count; namely, that the director of highways, under the present state of Ohio law, is powerless to close township or county roads. This authority is preempted by the county commissioners.

Making a final effort the Highway Department took the case to the State Supreme Court. Again the verdict was in favor of Mel Hulbert, et al. The director of highways, said the court, has no authority to close county and township roads and that was that. Today Township Roads 100 and 108, the other road involved in the case, are open and cross Interstate Highway 75 at grade. Eventually, overpasses will probably carry their traffic. But the Hulbert case proved again the solicitude of the American law for the rights of the individual and showed how a little man with courage can defend himself successfully even against a powerful state official and a $36 billion federal program.

An interesting sidelight on the Hulbert case was the comment of a state official a short time after the decision in the Supreme Court. To the observation that the case had decided an important constitutional question he replied: "What question? I don't believe anyone in this department seriously believed we had the right to close those roads." Ponder that one.

The Ety and Hulbert cases emphasize the point that in the extremity the court is the property owner's best friend. Yet the majority of cases need not reach this extreme. The following guides can be a big help in bringing about equitable settlements:

(1) Be alert. This is essential. If you have any suspicion at all that your farm lies in the path of a new highway, that the one which abuts your place may be made subject to controlled access, or that the construction of a new highway may cause your road to be blocked, get all the information available. Drop into your county court house and visit with the county engineer, the county commissioners, or the county court if your state has no county commissioners. They will be the first to know what highway proposals are under consideration. You might also contact your state highway department at your state capitol.

(2) Watch for the official notices announcing any public hearings on proposed constructions. And do not fail to attend those hearings. This will probably be your first opportunity to learn exactly where the new road is going. You may be surprised. The hearing is your first line of defense. If you have any objections, voice them now and get them on the record.

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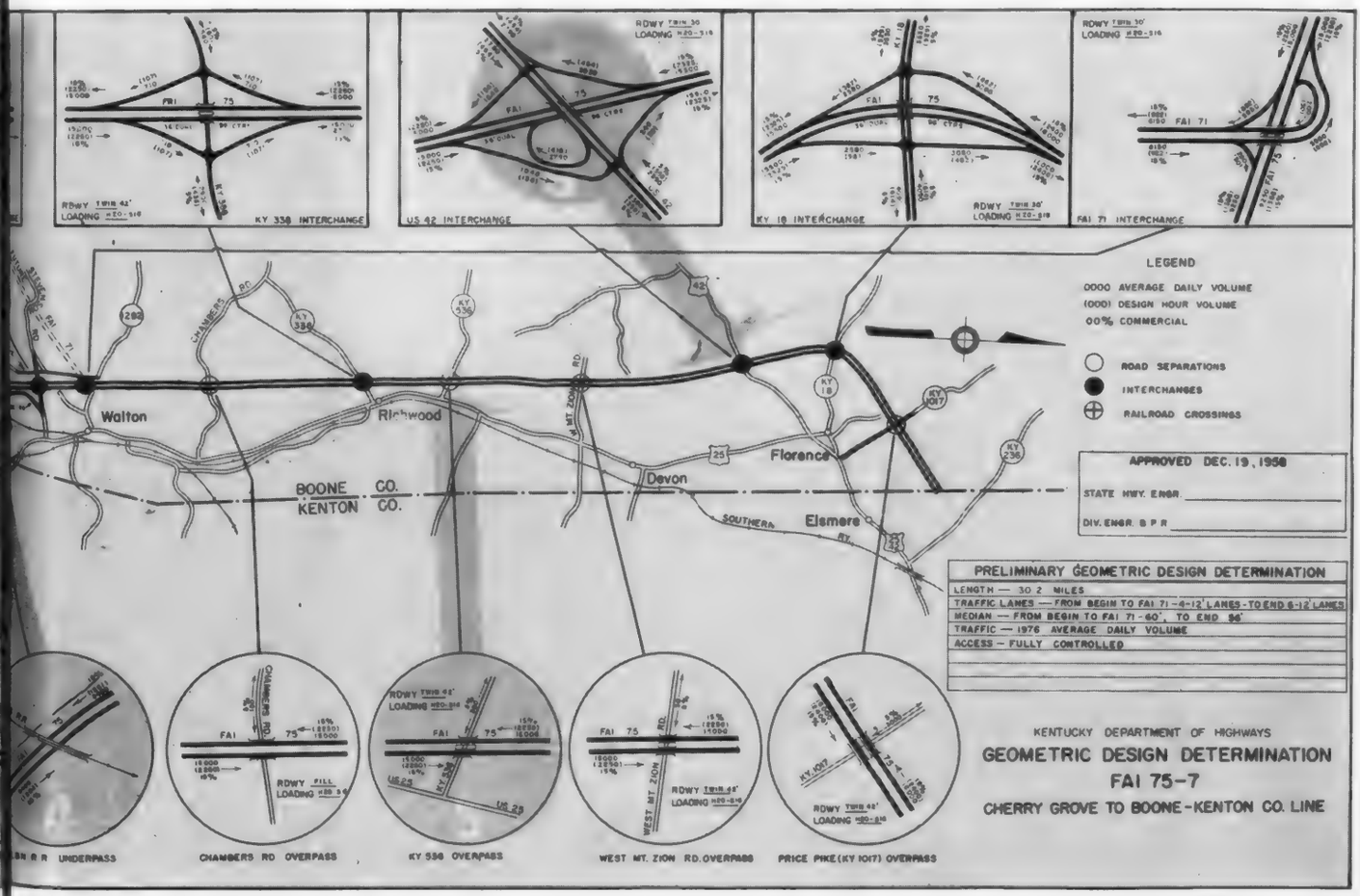


# Lightning, the Destroyer

## Lightning takes a heavy toll of life, buildings, and livestock from the farmer.

THERE ARE FROM 40 to 80 lightning strikes on every square mile of this country every year. At that rate somebody, or something, is bound to get hurt. And somebody or something does get hurt; lightning kills some 600 persons every year in the United States, injures about 1500 others, and causes more than $100,000,000 property damage.

Lightning is born in the wild turbulence of storm clouds. As the humid air condenses to rain drops there is a separation of electrical charges. Usually negative charges accumulate in the lower part of the cloud, positive charges in the upper part of the cloud and on the earth. When the attraction between these opposite charges becomes strong enough, they leap across the gap of air between—and there you have lightning. In leaping the gap of nonconducting air between cloud and cloud, or between a cloud and the earth, the tremendous heat and energy ionizes and explodes the air molecules—and there you have a clap of thunder.

Although a lightning stroke appears to be a single flash of light, it is usually a series of discharges, one following the other like bullets from a machine gun, all delivered at the target in a split second. The flash of light we see is actually the path of the bolt in the burning air. A single stroke may have a duration of 100 to 200 microseconds. Since a microsecond is one millionth of a second, few things are "as fast as lightning."

A bolt of lightning is amazingly small for the wallop it packs—only ¼ to ½ an inch in thickness. It is surrounded by a 4-inch channel of intensely heated air. The length of the stroke may be from 2,000 to 15,000 feet, rarely more. The average is about 4,000 feet. All strokes are multiple. There may be as many as 40, spaced up to a half second apart.

There may be a buildup of hundreds of millions of volts in a bolt of lightning, but as every high school physics student knows, voltage alone does not determine power. Power is determined by amperage. A toy "magic wand" may have a buildup of 20,000 volts, but it gives only a mild shock, because the amperage is low. In contrast, at Sing Sing prison only 2,500 volts are used in the death chamber, but the amperage is high and fatal.

Accompanying the multi-million voltage of lightning there will be from 1,000 to 340,000 amperes, sufficient to splinter a large building or shatter a large oak into toothpicks. It takes 120 volts and less than one ampere to light a 100-watt electric light bulb.

Because a lightning bolt is of such short duration, the electrical power expended is quite small. On the commercial market, you could buy a bolt of lightning for 25 cents—its worth in kilowatt hours. Yet this two bits' worth of lightning is quite sufficient to destroy a million-dollar building or kill off a herd of cattle.

A bolt of lightning may be "cold" or it may be "hot." Some strikes will set a building afire, some will only shatter. A "cold" bolt merely shatters.

Lightning may strike from the earth upward as well as from the sky to earth, or from cloud to cloud. Since the positive and negative charges tend to leap the shortest distance between each other, a high place or object on the earth is more likely to be the meeting place than a low place or object. The highest tree on the highest hill in the area is a potential target. So is the tall man in a crowd, an umbrella, a chimney or a haystack. Any building in the United States is a potential target for about 40 electrical storms a year.

Isolation is another factor. A single tree, animal, person or building is more likely to be struck than one among many. A tall object will afford a "cone of protection" for its neighbor, roughly within a radius of one or two times the height of the object. But lightning likes to contradict theories—it will sometimes dip down and strike the shanty nestled among skyscrapers.

Just as it is impossible to predict when and where lightning will strike, it is impossible to predict what it will do when it does strike. It may bounce off a neighbor's field, into your house and knock you out of your shoes without giving you anything more than a terrific fright; it may knock down your chimney, set fire to your barn, or travel along a wire fence and kill cattle standing near the fence a mile away. It may strike a post and not so much as a sliver will be knocked off.

The story of John Stark, a Moline, Illinois, farmer, is the type of story that created, in days gone by, a superstitious awe and dread of lightning. Truly the "wrath of God" was vented on the unfortunate John Stark. In the first of Stark's bouts with lightning, a bolt struck his barn, destroying the building and all his livestock except two horses, in pasture at the time. Ten days later a metal hayshed, which had escaped the first catastrophe, was struck and the building and contents were destroyed. The next summer Stark was walking along a barbed wire fence when a sudden storm overtook him. Lightning struck the fence, jumped to Stark's body, and knocked him down and out. Though severely injured, he recovered. But lightning was not done with John Stark. Seven years after his first exposure to the wrath of heaven, he was visiting a neighbor and the two of them were standing in the doorway of a barn watching a storm blow by. A bolt struck the barn, entered Stark's chest, and the pursuit was ended.

Lightning may occur in any month in most parts of the United States, but is most frequent during the summer months following a hot spell when extremes of temperatures on the earth and at high altitudes set up violent turbulences.

Following a few simple rules will greatly lessen the danger from lightning. The first is to stay inside during a storm, preferably inside a protected building. If you are caught outside, and especially if you have the sensation that your hair is standing on end, lie down as quickly as possible, in a ditch or other depression, so

(*Continued on page* 114)

**When the storm hits and the lightning flashes (right) it's too late to protect your barn; when the skies are clear there's no need for protection. This is why losses to farm buildings from lightning run to millions every year.**

COOP

# The Agricultural Dilemma

By Charles R. Koch

Agriculture is in trouble and is headed for more. Its ability to produce is unimpaired. But to market that production at a decent price and profit shared by all farmers is a tremendous challenge. Except for the Korean War period and a bit of recovery last year, realized net farm income for the total agricultural plant has been in a decline for the past 12 years. To bolster that income, increasing millions, rapidly accumulating into billions, have been pumped into the government price-support programs. And the hope that population increase will soon bring demand into line with production potential fades away in the light of the most recent population projections to 1965.

Basically there are five alternative approaches, or combinations of these approaches, upon which some kind of solution to this dilemma might be built. Here we are going to attempt a reappraisal of this never-ending farm problem and enumerate these alternative approaches and their chances of success.

Before diving into the theory, though, let's get the feel of some of the grass-roots opinion. Last winter, for example, a Nebraska farmer said, "I wish farm thinkers would quit trying to tell us how to grow more corn and come up with some new ideas on what to do with it. We have corn running out of our ears out here and we're going to have more of it by next fall. Anybody can grow the stuff. The real trick is making it pay off."

At a farm managers' meeting, a successful grain grower presented his formula for meeting the price-cost squeeze: "Reduce unit costs by constantly increasing production per acre, per hour of labor, per dollar of investment. I don't care how far the price falls, I'll grow corn at a profit," he said.

Then an economist took over. He congratulated his predecessor on his ability and ingenuity. But, since it is the province of the economist to take a broader view, he took issue with this corn farmer. "A few can get away with it, perhaps one grower out of ten, but how about the other ninety per cent?" he asked. "The individual producer cannot constantly expand his production with no regard for the demand for his product or the limitations of the market.

"Right after the war there was a strong demand for farm tractors," he continued. "In 1948, American tractor manufacturers produced over 529,000 wheel-type tractors. In 1951, they put out a record 567,000. But then the demand began to decline. Did they adopt the attitude, cut per unit cost through greater production? Not by your old horsecollar. They simply tailored production to demand and by 1954, they were turning out only 248,000 tractors, less than half their production of three years earlier. Did the price drop? This is no time for foolish questions. But if the farmer is to become the businessman everyone is urging him to be, collectively he is going to have to learn well that first principle of business—not to over-produce his market."

The remarks of the Nebraska farmer, the Midwest manager and the economist, point up the divergence of current thinking—confusion might very well be the term—on the perennial farm problem. To top it all off, at a time when the vast majority of the electorate are completely ignorant of the farmers' problems and entirely unconcerned with agricultural welfare, the city newspapers are playing up the all too obvious blunders of the farm program, oversimplifying the situation, and demanding extreme reforms which could only spell disaster for the farmer and the millions who service his needs.

The basic weakness of agriculture seems to have escaped most of those who would prescribe for it. Willard W. Cochrane, professor of agricultural economics at the University of Minnesota, put it this way: "Farmers generally do not realize the seriousness of their situation; they live by a myth—a myth of a 'sound,' healthy agriculture that is only a little out of balance. They live by this myth because they have been told repeatedly by politicians and their leaders that agriculture is basically 'sound'—that with a little 'fixing' this 'emergency' will pass and all will be well. But the hard facts are that the core of agriculture—the feed, grain, livestock economy—is sick and no slight-of-hand is going to make it well."

### The Winding Road of Farm Profits

Though some individual producers have prospered, except for 1958 and a lull during the Korean War, the road of farm profits has been winding continuously downward since 1947. Net realized income of farm operators totalled $10.8 billions in 1957—37 per cent below the $17.3 billions of 1947 and 29 per cent below the $15.2 billions of 1951. Cash receipts from farm sales have been much more stable. Gross income from farm sales in 1957 equalled that of 1947 and was approximately 10 per cent under sales of 1951. But 1957 farm output exceeded 1947 by nearly 20 per cent and the index of farm costs averaged 23 per cent above 1947. In other words, farmers produced much more than ever before and

**With enough wheat in government storage to provide bread for every man, woman and child in the country for the next five years, much of the new crop will be bulldozed into yellow mountains under the open sky. How long can this situation prevail? Or what steps can be taken to bring production into line with demand? This is the agricultural dilemma.**

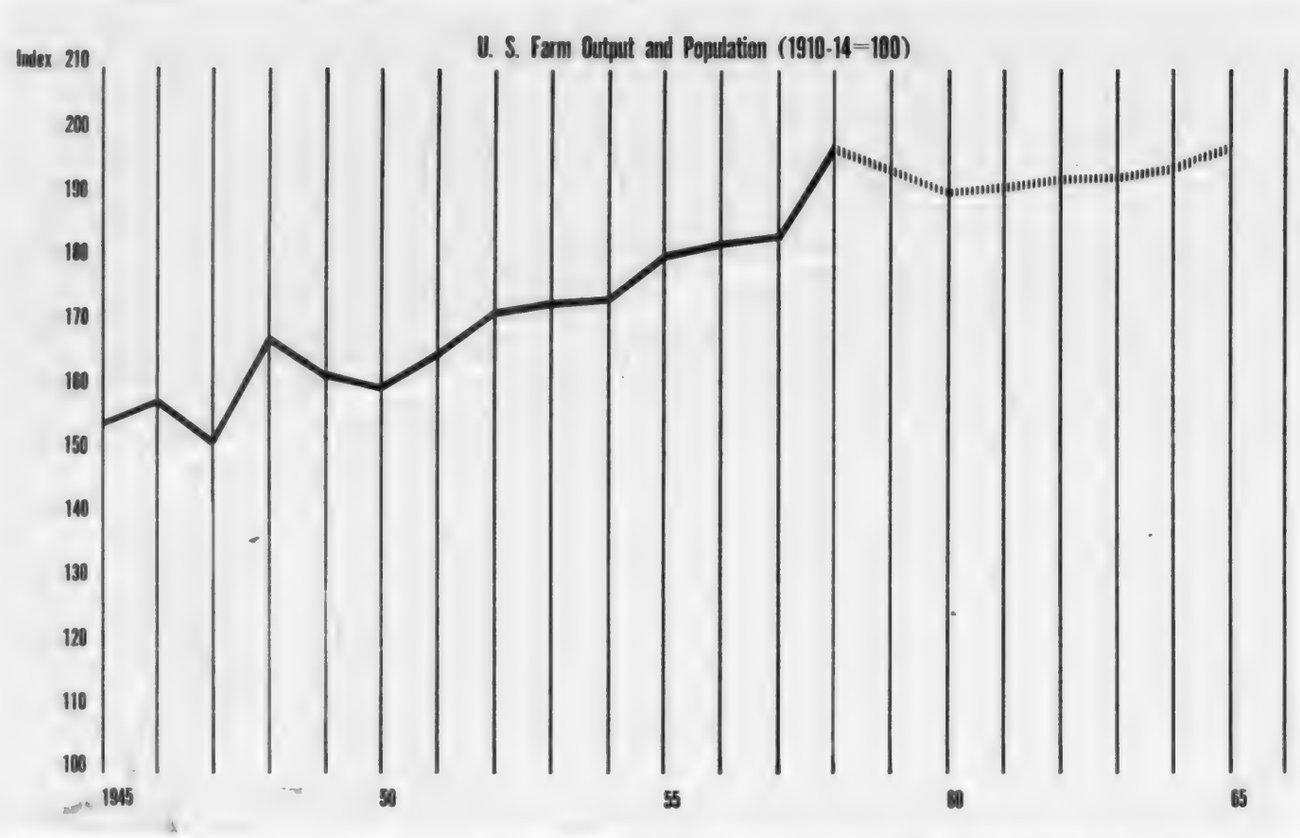
## The Agricultural Dilemma

The government is now spending well over $2.5 billion per year on price supports; yet agricultural surpluses continue to pile up, realized net income of agriculture continues to decline and no one sees any sign of a natural adjustment.

The farmer is unhappy, the taxpayer is fast losing his patience as well as his shirt, and the urban voter, who, through his representatives, is largely responsible for the design of any governmental farm program is completely ignorant of the whole broad problem, to say nothing of the intricacies of its myriad ramifications.

Basically, there are five alternative approaches to a solution: (1) Let the problem work itself out in the open market; (2) change the market demand patterns by increasing consumption at home or abroad; (3) change the supply pattern; (4) change the competitive structure of agriculture, and (5) transfer income from nonfarmers to farmers by means outside the market.

These alternatives are here presented against a background of current reality so all those who would advise may have a fuller knowledge of the consequences of their advice.




**Tremendous strides in agricultural technology blunt the possibility that the surplus problem will be solved by population catching up with supply. Farm output (black line) and total U.S. population (white line) (both based upon an index 1910-14 equals 100) are plotted on the chart above from 1945 through 1958 with estimates to 1965. By that year the output of food products will probably still be 15 to 20 per cent in excess of consumption.**

netted less for it because of higher costs.

Since there was a decided exodus of manpower from agriculture during this period the decline in per capita income was not as great. In 1947 there were 10.4 million workers in farming; by 1957 there were only 7.6 million. The average income per worker in farming dropped from $1,937 in 1947 to $1,793 in 1957. During the same period the average annual wage per employed factory worker rose from $2,598 to $4,284.

With higher prices and higher marketings, 1958 net realized farm income was about 20 per cent above 1957. After six continuous years of decline, this rise in net farm earnings gave welcome relief. But apparently this was only temporary.

It now appears that income in American agriculture will run counter to trends in the over-all general economy of the country for a second straight year. 1958 saw rising farm prices and earnings in the face of a general recession. As recovery in the general economy carries into 1959, the combination of larger farm marketings and slightly rising farm costs will bring lower prices and a somewhat lower parity ratio for U.S. farmers. Barring any major change in the international situation, we shall probably see a recurrence of the profit squeeze in American agriculture, especially in the cornbelt, though as in any industry there will be those fortunate and industrious individuals who will do well even in the squeeze.

### Runaway Production

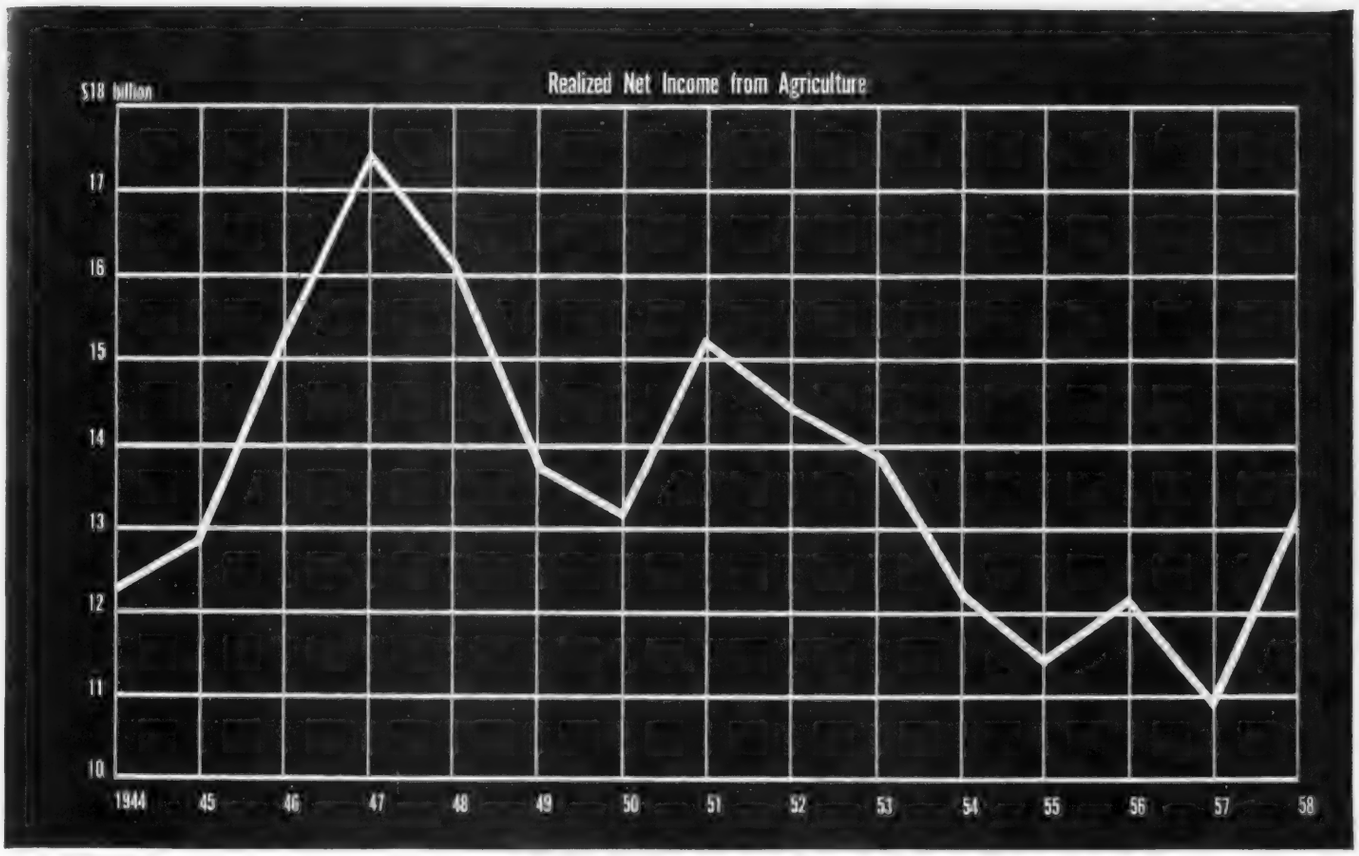
From 1947-49 through 1957, crop production in the United States increased only 6 per cent while the output of livestock and livestock products increased 21 per cent. In one year alone, 1958, we have had an 11 per cent increase in crop production on the smallest harvested acreage in 40 years. That "whopping" increase in crop production will result this year in expanded output of livestock and livestock products, increased government storage, or expanded private and government exports. Livestock production and government storage will bear the brunt of the increase.

The demand for farm products is not expected to be greatly changed by the general business recovery in prospect. The business fluctuations we have had in recent years do not appear to have had an important influence on the demand for farm products. However, wider fluctuations in business conditions undoubtedly would have a marked effect on agricultural prices. Market supplies of a number of major agricultural products will increase substantially. Price relationships in the aggregate for farmers will be less favorable. The index of prices received by farmers is expected, therefore, to decrease and the index of prices paid will be a little higher. Cash receipts for the U.S. farmer are very likely to be 3 to 5 per cent lower this year than last. Net farm earnings, therefore, can be expected to decline considerably more than farm prices. Farm earnings in the aggregate could parallel closely those of 1957.

For the long run, prospects do not look any better. Currently, economists estimate we are producing almost 8 to 9 per cent more than the combined domestic and foreign market will take at a net return to the American farmer somewhat comparable to other segments of the economy. We still read much about potential food shortages in this country in some 10 to 25 years with the rapidly rising population—increasing approximately 2 per cent per year and estimated to total well over 200 million people by 1975. Will these output-expanding technologies soon "run their course" and population increase outrun increases in the food supply? Or, are the technologies coming along so fast that the present imbalance of supply could easily worsen?

James T. Bonnen, Michigan State University, in a study for the National Planning Association makes the most detailed estimate of possible increases in output up to 1965:

"Many of the estimates of production involve substantial increases and, in aggregate, provide a rough indication of the increased efficiency with which we are likely to be using land resources by 1965. The combined indices of crop yields and the efficiency of feed utilization show an increase of between 25 and 30 per cent over




**Realized net farm income showed gains during the Korean War and again last year. But with the exception of those two periods it has been in a decided downtrend for the past 12 years. The cost squeeze is wringing out the profits. Gross income from 1957 farm sales equalled that of 1947; but output was up 20 per cent. Farmers produced more and netted less because of rising costs.**

the decade (1955-1965). Increases twice as large as this are physically possible. However, if consumption grows only 20 per cent, while yields and feed utilization efficiency expand 25 to 30 per cent, it is obvious that we shall have to reduce land and other resource inputs or face increased overproduction. This is all the more obvious when you take into consideration the already existing large surplus stocks and the current excess production capacity of about 8 per cent per annum which we faced at the start of this decade of rapid growth and adjustment. Thus, if there were no adjustments in resource inputs, an 8 per cent excess of capacity combined with an increase of 25 to 30 per cent in yields and efficiency of feed utilization would result in an output of food products 15 to 20 per cent in excess of 1965 consumption levels."

Bonnen estimates that harvested acreages of all crops would have to be reduced by about 15 per cent by 1965 to offset the expected increase in yields and feeding efficiencies. Individual crops, such as corn or cotton, which are in major surplus, would have to be reduced by two to three times the average of all crops.

War, depression, and other severe organizational and technological innovations impossible to anticipate would materially change these estimates, of course. If the situation during the next half dozen years parallels the recent past in the overall economy, we can expect a continuance of surplus stocks and continued imbalance between production and consumption. Bonnen's estimates to date are the most comprehensive available on this subject. The consensus among most economists close to the agricultural problem would be very similar to his conclusions.

### Propping Up the Props

All this makes it ever harder to defend the government farm program, particularly the price support features. The program under which we operate today is basically the same one which was hammered out in the 1930's. The agriculture of that remote day bears as little resemblance to ours of today as the Model T does to the Thunderbird. And, basically, that is what the city newspapers are screaming about—without offering any acceptable alternatives.

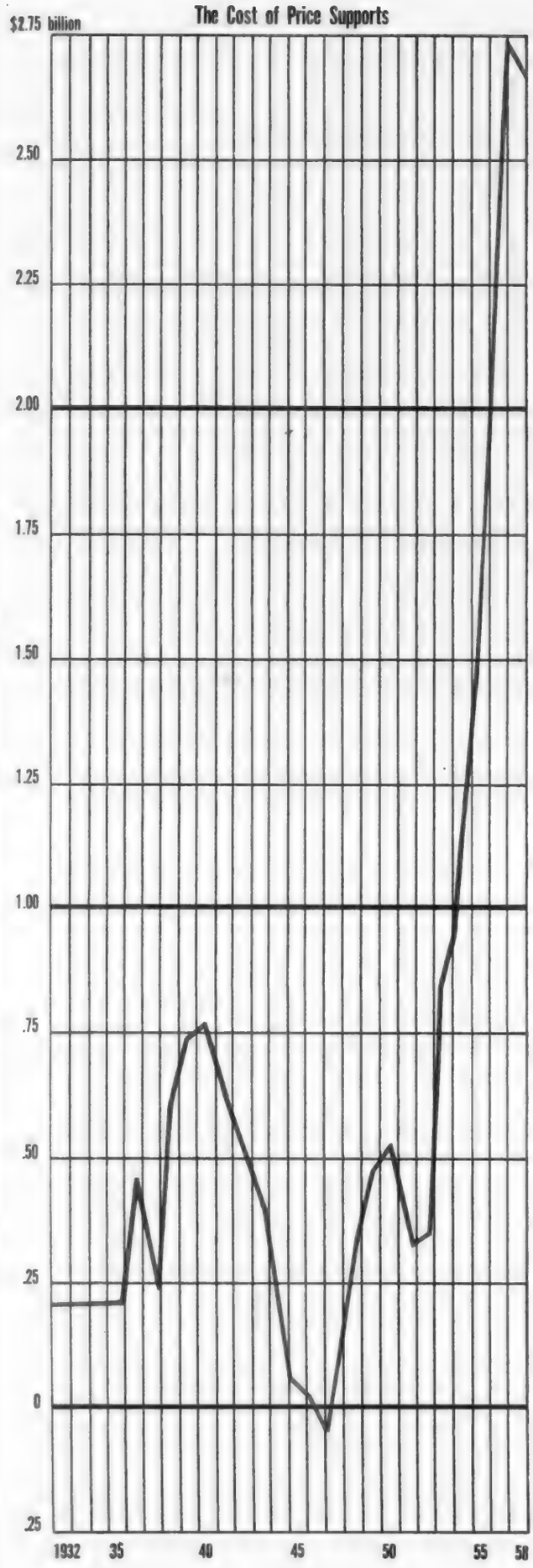
Federal expenditures for agriculture will approximate $7,000,000,000 in fiscal 1959—the bulk of it for price stabilization and related activities. These expenditures will average something over $1,000 per farm. Annual price stabilization expenditures never exceeded one billion dollars until 1955. Since that time they have been mounting rapidly and will exceed $3,000,000,000 in fiscal 1959. Expenditures of the federal government for price stabilization during the 27-year period 1932 through fiscal 1958 totaled $15.7 billion ($7.7 billion in the last four years) as compared with $2.9 billion for research and education and $6.4 billion for conservation of resources.

Price supports have accelerated the increase in production efficiency per acre. There has been real incentive to add the "second shift" — heavy fertilizer applications—and even the "third shift"—irrigation water—on rationed acres. At the same time, a ceiling is placed on opportunity as acreage reductions are called for, with largest reductions generally on the biggest producers. There are such a high percentage of minimum acreage producers in some programs that many refer to the government support program as "guaranteed poverty."

At the same time, the bulk of the federal price stabilization payments will go to the large producers. A guaranteed price does not increase income very much if little or nothing is produced on the individual farm. Thus, many are pointing out that current price support programs are aged and rapidly weakening in that they support the status quo and do not facilitate badly needed adjustments.

### The Alternatives

But what can be done? Basically, all proposals to improve the income position of agriculture fall under one, or a combination, of five categories. Somehow or other most analysts seem to ignore the fact that any exist except the one he is at the moment



**From 1932 through fiscal 1958 the federal government spent a total of $15.7 billion on farm price support programs. But $7.7 billion, almost half of the total, was spent in just the last four years. In 1947 the government actually realized a profit of $88.5 million. The first year in which stabilization expenditures reached the billion-dollar rate was 1956. The chart dramatizes this tremendous recent increase in the cost of the program.**

promoting. Thus the layman can hardly be blamed for harboring a decidedly restricted and over-simplified view of the problem and its solution.

*What we offer here is not a solution to the farm problem, but a bird's-eye view of the various alternatives and their implications. From them thoughtful men may some day work out a blueprint.*

As outlined at last year's Conference of The Farm Foundation, a non-profit educational foundation for the improvement of agriculture, the alternatives are five: (1) Let the problem work itself out in the open market; (2) change market demand patterns; (3) change the supply; (4) change the competitive structure of agriculture; and (5) transfer income from non-farmers to farmers by means outside the market.

Let's examine each of these briefly.

### The Free Market

This is the highly publicized goal of most proposals. Such an approach would mean dropping all price supports, export programs, marketing agreements, acreage controls, and the like. Even if all present government stocks could be completely insulated from the market, most economists estimate current net farm income would drop somewhere between one-fourth and one-half. The decline would spread quite un-

evenly over producers of different commodities. For example, wheat, cotton and tobacco, which currently have very heavy government support programs, would be much more severely affected than many other types of agricultural products.

Walter Wilcox, an economist of the Library of Congress, estimates that the contribution of price support activities as a percentage of total net farm income in agriculture ranged from 28 to 50 per cent during the years 1952 through 1956. After a number of years in a free market, net income could be expected to improve gradually from its initial low point as total farm production increases tended to slacken. But the time and pain would be great.

### Change Market Demand

Increasing demand for farm products is, of course, one important way to increase income. This can be especially effective where there are no close substitutes to the crop in question. Possible ways of increasing demand, not all equally promising, include:

(1) Subsidizing consumption at home or abroad. Subsidizing food consumption of low-income families or through the school lunch program for school children is an important example of this approach. The school lunch program has long been a part of the government agriculture program.

*(Continued on page 130)*

**Two of the more commonly offered solutions to the agricultural dilemma are a return to the free market as exemplified by the action in the grain pits of the Board of Trade (above) and increasing the demand for farm products through greater exports (below) and the subsidization of consumption abroad. Neither of these programs, by itself, seems to be the answer.**

# Windrows without Rakes

## The self-propelled windrower harvests hay, silage, and grain rapidly and economically.

By Chester Charles

THIS SEASON, a lot of farmers will spend over two thousand dollars for a machine unknown ten years ago. The self-propelled windrower or swather has a useful place on farms. You may not think you need one. Your wife will be certain you can't afford one. But if this summer at the county fair you sit on one and feel the response of the controls and see the quality of the crops it helps turn out, your money is going to be burning a hole in your pocket.

No buying epidemic has as yet started. Machines are few and far between. But here and there across the land, spotty rashes of windrowers are being propelled across hay meadows and grain fields, in straw, seed crops and silage, in green mints, edible peas and grain sorghums. Wherever the machine has appeared, the entire area has been infected with windrower fever.

Pull-type windrowers which resemble old binders have been used for years in grain harvest in the northern states. They cut the grain with a sickle and convey it across a flat canvas for end delivery to the ground. A number of makes are still being manufactured. Invention of the first self-propelled, center-drop windrower is generally credited to Amos Ommodt, a farmer of St. James, Minnesota. He turned out a working model in 1949. Rights to the machine were purchased by the Owatonna Manufacturing Company of Owatonna, Minnesota, who produced the first commercial machine in 1950. Not long after, a similar machine was designed by Gordon Lawson of Postville, Iowa, who produced several dozen for local use prior to 1955, when he sold out to the Hesston Manufacturing Company of Hesston, Kansas. All the early models, of light construction, were intended for use in harvesting grain only.

Most of the major tractor manufacturers have since entered the field. More than a dozen makes are available, and more are on the drawing boards. The simplicity, the wide usefulness and the ready acceptance of the windrowers by farmers has sparked a sudden competition among manufacturers.

### They Look Familiar

Basically, all commercially-available windrowers are alike. A wide combine header, with reel and sickle and canvas, is mounted on a three-wheeled framework chassis in the manner of a side-delivery rake. The third, castor or "crazy" wheel, is behind, like a tricycle in reverse. The engine and driver's seat are above and behind the reel. The platform or header is not flat as in a pull-type windrower, but slopes upward to the rear, as in a combine. However, the canvas, in two sections, runs sideways instead of front to back. In a 12-foot model, a 4-foot canvas runs from each end toward the center. The windrow is formed in the 4-foot opening between the canvases. The plants cut by the sickle directly in front of the center opening fall straight backward. The plants conveyed by the canvases from each side fall into a crossed pattern like stacked, interlocked fence posts. The rear castor wheel of the windrower is slightly off center so it does not over-ride the windrow.

The header is lifted and lowered hydraulically. The height of the reel above the sickle is also controlled in this way. Power is supplied by gas engines, mostly Wisconsins, of 18 to 30 horsepower. Chrome-plated sickle sections and ledger plates, usually standard equipment, prevent gumming, wear indefinitely and seldom require grinding. The height of cut ranges from about 2 inches to about 30 inches. Some models come with stilts which are attached between the wheels and frames to allow higher cutting in tall crops. The more expensive machines offer full flotation; the platform floats on heavy springs up and down, from side to side as well as from front to back, at any cutting height. It can float up to 12 inches higher on one end than the other, a valuable asset on uneven ground such as irrigation borders. Ground speeds up to 12 miles per hour are possible. Hay-conditioner attachments are now available for use with several makes.

The Owatonna Company produces a number of models of windrowers under their own name. They also produce drive mechanisms for several other makes of windrowers. The distinctive features of their units, also available in Ford's model, affect the drive mechanism and platform angle. Separate planetary gears drive each

**In one pass over the field, a swath up to 16 feet wide is mowed and windrowed. A conventional sickle bar cuts the crop, which is conveyed inward to the center opening of the header where the windrow is formed.**

**The three-wheeled mounting, lever-type steering, and separate power control for each front wheel, give unusual maneuverability. A fluffy, criss-cross windrow hastens drying and minimizes weather damage.**

front wheel, giving great maneuverability. The angle at which the header platform is sloped is patented. Owatonna engineers believe the best windrows are made with the platform at an angle between 22 degrees and 35 degrees from the ground.

The Hesston Company, in addition to producing its own windrower, manufactures models for Case and Cockshutt. Hesston features include V-belt transmission, radial platform flotation, and patented "trim steering." The latter, an aviation term, lets a farmer make up to 15-degree turns without disengaging power to the wheels. This device also corrects for side drift on hillsides. Another Hesston feature is their special header linkage which keeps the sickle parallel with the ground regardless of the height of cut.

The new machines cut and windrow in one pass over the field. They had their first application in the northern grain areas, sections where oats, barley and flax and some forage seed crops ripen unevenly, preventing direct combining. It has been common practice to mow such crops, windrow them with a side rake and then combine them after they ripened in the windrow. The self-propelled windrower took care of the mowing and raking and also brought advantages with crops other than grain:

**Over a dozen models of self-propelled windrowers are being manufactured. Current models, of rugged construction, cut heavy wet forage crops as well as grain. Specifications of some of them are charted below.**

(1) The fast-traveling, center-drop canvases bring the crop together in a fluffy, criss-cross or herringbone windrow, heads up and towards the center, butts down and pointing out. Aeration is better. Drying is more even, safer, quicker.

(2) In the criss-crossed windrows, exposure to sun, dew and rain are minimized. Hay crops retain their leaves and green color, their carotene and protein. Crops suffer less weathering and shattering.

(3) The criss-cross windrow fans open as it is picked up by combine or baler, making for more even feeding and higher speed. Bunching and clogging are reduced and more uniform bales result. Repair bills may be cut.

(4) Field travel is slashed. To get 100 acres of hay ready to bale, average travel is 351 miles, with a 7-foot mower, 7-foot conditioner and an 8-foot rake. With a 14-foot windrower equipped with a conditioner, the travel is reduced to 58 miles, more than 80 per cent less. Or a narrow combine, following a 12 or 14-foot windrower, can compete with a much wider combine cutting direct.

(5) Time, labor and fuel are greatly reduced. An unskilled boy on a 14-foot windrower can windrow 40 to 60 acres in an 8-hour day. Gasoline usage will average from a quart to a half gallon per acre. Otherwise, 4 men and 4 tractors, using a half gallon of gasoline each per acre, would be needed to complete the same acreage in a day. The faster windrower can cut more acres at the best stage of maturity, and the reduced travel with the light machine lessens soil compaction.

(6) There is no need for back-swathing, or doubling up on windrows when fields are opened up. Fields can be opened anywhere without running over any crops. Unripe sections of fields can be skipped until later without any crops being knocked down.

(7) Residues of previous crops, stones and dirt are not raked into the crops being harvested. There is no windrow roping which retards curing and hinders baling when a crop is side-raked.

(8) Farmers who do not own combines are no longer at the mercy of custom combine operators. The grain can be windrowed when at or near maturity and allowed to lay on high-cut stubble, unexposed to shattering, to winds and to lodging, until combining can be accomplished.

But the price is quite high. An average unit comes close to $2,500 delivered. Research men as yet have very little to say about the number of acres to cut to justify ownership. An annual total of 250 acres has been suggested by several sources. How-

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## Relative Features of Self-Propelled Windrowers

| Manufacturer or Model | Type of Drive | Trim Steering | Platform Angle | Parallel Header Linkage | Full Flotation of Header | Enclosed Drive Chains | Adjustable Header Shoes | Width of Cut Available | Weight for 14 Ft. Cut | Retail F.O.B.* | Hay Conditioner Attachment Available |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Case 820 | Belt | yes | 21° | no | $37.50 extra | no | no | 10-16 ft. | 2700 | $2,286 | no |
| Case 850 | Belt | yes | 21° | yes | $37.50 extra | yes | $19.50 extra | 10-16 ft. | 3472 | $2,830 | no |
| Cockshutt 423 | Belt | yes | 37° | yes | $37.50 extra | yes | $19.50 extra | 10-16 ft. | 3500 | $2,875 | no |
| Ford | Planetary Gear | no | 22°-35° | no | no | no | no | 10-16 ft. | 3425 | $2,563 | no |
| Hesston 220 | Belt | yes | 37° | yes | yes | yes | yes | 10-16 ft. | 3500 | $2,865 | yes |
| IH McCormick 183 | Belt & Gears | no | 23° | no | Optional | no | no | 10-16 ft. | 3937 | $2,580 | no |
| John Deere | Planetary Gear | no | 21° | no | no | no | no | 10-16 ft. | 3345 | $2,706 | no |
| Massey-Ferguson | Planetary Gear | no | 36° | no | yes | no | no | 10-16 ft. | 2975 | $2,554 | no |
| Oliver 85 | Planetary Gear | no | 22°-35° | no | no | no | no | 10-16 ft. | 3070 | $2,475 | no |
| Owatonna S | Planetary Gear | no | 22°-35° | no | yes | no | yes | 8-14 ft. | 2637 | $2,140 | yes |
| Owatonna E | Planetary Gear | no | 22°-35° | no | yes | no | yes | 12-16 ft. | 3320 | $2,250 | yes |
| Owatonna D | Planetary Gear | no | 22°-35° | no | yes | no | yes | 10-16 ft. | 3500 | $2,560 | yes |
| Owatonna Super 60 | Planetary Gear | no | 22°-35° | yes | yes | yes | yes | 10-16 ft. | 3950 | $2,815 | yes |
| Swath Queen | Worm Gear | no | Auger (no canvas) | no | no | no | no | 10-12 ft. | 5200 | $4,500† | no |
| Versatile | Belt | yes | 22° | no | yes | no | no | 12-16 ft. | 3300 | $2,195 | no |

* Price for 14 ft. cut excluding engine and starter.
† Price for 16 ft. cut excluding engine and starter.

# *one of the great men of agriculture,*
# Carolus Linnaeus, 1707-1778

By Grant Cannon

ON THE EIGHTH DAY, Adam gave names to all cattle, and to the fowl of the air, and to every beast of the field. His descendants have continued the practice. And of all the sons of Adam, Carolus Linnaeus, a Swede, has been the greatest name giver. He set himself the task of naming every tree and shrub and herb, every beast and bird and fish, and the whole world of insects.

In performing this great work, Linnaeus brought a semblance of order into the wonderful, confusing world of nature. By the application of artificial standards he divided and categorized, untangled and pigeon-holed the thousands of species of living things. And he gave the men of his time and those who followed the ability to communicate their findings, to pass on and pool their knowledge of the living world. For, as he said, "If the name be lost, the knowledge of the object be lost also; and without these, the student will seek in vain for the means to investigate the hidden treasure of nature."

Farmers had passed on their knowledge of crops and pasture plants, the nutritious and the poisonous, from father to son. But their knowledge hung on the fine thread of memory and the facts which one group knew were totally unknown to their neighbors. In Lapland, for example, Linnaeus visited the distressed community of Tornea where he found the farmers cursing the "disease" which annually killed scores and even hundreds of their cattle. In this bleak, northern country with its long, icebound winter and its intense short growing season, such losses were disastrous. Taking a short walk through the pastures, Linnaeus quickly discovered the cause—the deadly water hemlock growing abundantly. He also showed them how the plant could be dug out and destroyed in short order, even by a girl. Abraham Fougt, the pastor and an educated man, had read of the poisonous nature of hemlock. Why hadn't he warned his people? It was not called hemlock in Lapland and he could not associate this innocent-looking herb with its deadly name.

Linnaeus was enormously successful in his classifying and naming plants and insects. Our whole naming system today rests firmly on the foundation he laid. And others perfected the beginnings he made in the animal kingdom. He was so successful, in fact, that it is hard to conceive of that period, 250 years ago, before his work was begun. It is also hard to remember that he worked without the insights and theories and laws which have come to us since his time—the laws of heredity discovered by Gregor Mendel in his abbey garden; the theory of evolutionary change which occurred separately to Darwin and Wallace, based on their world-wide observations; the demonstration of the cause of disease by Pasteur; the knowledge of soil chemistry wrested from the earth by Von Liebig in his fume-filled laboratory at Giessen; and the reliable knowledge of plant breeding and hybridization, plant nutrition and physiology that has come since.

It is equally difficult for us to believe that the mass of superstition, myths, twisted biblical lore, and nonsense of Linnaeus' time was taken seriously even by the most intelligent. How could they believe that orchids sprang from the droppings of exotic birds rather than from seed; that the peony would cure diseases of the brain because the sepal of the bud resembled the brain pan; that swallows spent the winter at the bottom of the ocean rather than migrating south; that plants had no need for the sun since the Bible clearly states they were created on the third day while the sun was not created until the fourth; that the cuckoo changed into a hawk in autumn; that St. John's-wort was a good remedy for wounds because its leaves seem to have been stabbed? But they did.

How could learned men such as Chesnecopherus spend their time arguing, "The vulgar herd regards the part rising upwards as the upper part of the plant, and that penetrating into the earth as the lower; but the more farsighted philosophers realize the truth of the opposite, and that man should accordingly be regarded as an inverted plant and the plant as an inverted man, which accordingly must be standing on its head. One of the many other proofs of this is that the mouths of the plants, its roots, are in the ground and its branches directed upwards, while the corresponding parts of man—his arms and legs—are directed downwards and his mouth at the top"? But they did.

How could farmers and scientists alike believe that poor soil would change wheat to rye, rye into barley, barley into ryegrass, ryegrass into bromegrass, and bromegrass into oats; and that a rich soil would reverse this process of transmutation? But they did.

These are the strange beliefs of the people at the time Linnaeus was born on May 23, 1707. Some work had already been done in the matter of names by his father, Nils Ingemarsson, the son of Ingemar Bengtsson, who, instead of following the old pattern of adding "son" to the father's first name, adopted the name Linnaeus after a famous lime-tree. Otherwise, Linnaeus would have been Carolus Nilson.

Carl—or Carolus as he signed it on his works which were written in Latin—named for Sweden's King, Charles the Twelfth, was the first child born to Nils Linnaeus, the pastor of the small church at Rashult, Sweden. In his birth, he fulfilled what he was later to teach as the first step toward health and happiness: to be born of young and vigorous parents in their full tide of sexual ardor. Though his home life was described by him as a happy one, his mother had wanted a girl and found this dark-eyed boy a disappointment. He became a father's boy and spent much of his infancy and childhood with Nils Ingemarsson in the garden at Rashult and later in the bigger garden at Stenbrohult, where the family moved. The father, an avid gardener and a student of plants, taught Carl the names of all of the plants and encouraged him to begin a garden of his own.

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**Carolus Linnaeus, the father of modern botany, is shown (right) in the medallion portrait, cast by the English potter, Josiah Wedgwood. The flower in his buttonhole is *Linnaea Borealis* which is shown in all of his portraits. The drawing (above) represents a pre-Linnaean idea of the sexuality of plants.**

# When do Plants Need Water?

By J. M. Eleazer

## Getting water to the crops when they need it most pays off at harvest time.

WE CAN FARM to the best of our ability, use good soil preparation, adequate fertilizer, good seeds, control insects and diseases, and use all of the common sense and know-how that we have—and if water is not there when the plant needs it, we'll have a meager harvest. And when should we water the crop? The answer to this question differs in different sections.

It may be of academic interest to the westerner. As one of them put it, "Why should we worry too much about when a plant can do with a little less water and when it has to be fully supplied to make a crop? Out here we have to pour the water on the whole growing season or we just don't make it."

In the humid East this problem is of more practical interest. A farmer may coast along during periods when the crop tolerates a drouth, but if he wants a profit at harvest time he had better be sure water is available when the plants need it most.

With our present incomplete knowledge and experience, it is hard to answer the question, when do plants need water? Experiment and experience across the rainfall belt have given us a few practical guides that might be helpful.

All crops require moisture at planting time to get a stand. If nature doesn't apply it, the farmer must, if he is going to get off to a good start. After that, the rules of thumb are not so simple. Dr. W. C. Barnes, who has been a pioneer in irrigation of truck crops in South Carolina, offers another general rule. He says, "It always seems to me that the easiest and best method is just plain observation. When a farmer sees that his crop starts to wilt by 10 o'clock in the morning, then it's time to start irrigating. And if you've got a big acreage to cover, you know that you'll have to start a bit before this time or you won't get over it all and some of your crop will suffer."

At Clemson Agricultural College of South Carolina, a scientist in the experiment station said, "Applying water between the time plants are established and the time the marketable portion begins to form has not proved as beneficial as expected. In cases of prolonged drouth, irrigation during this period is necessary. But in average years it usually fails to pay off in increased yields. Beginning when the marketable portion starts to develop, such as fruit setting of tomatoes and beans, tuber development of potatoes, silking of sweet corn, and head formation of cabbage and lettuce, and continuing so as to maintain moisture up to harvest, is the most important phase of vegetable irrigation. If crops are allowed to become stunted before water is applied, such defects as fruit cracking of tomatoes, second growth of potatoes, and splitting of sweet potatoes may offset all the benefits of irrigation. In most seasons, one or two irrigations will often make the difference between profit and loss and occasionally between a good crop and total failure.

"Crops vary in the number of irrigations needed to carry them through this maturing period. For example, one good irrigation will usually take sweet corn from silking to harvest; whereas, beans require at least two, if no rain falls, and cucumbers and tomatoes may need five or six waterings."

From the Florida Experiment Station comes the word, "Vegetable crops are usually irrigated when the soil surface (one-half to one inch) has dried out." The Florida scientists also found that irrigation applied as needed during the blooming period of their citrus crop brought highly significant increases in yield on the three varieties of oranges on which the experiment was conducted. And from California comes the suggestion, "The orchardist should be able to judge when his trees need water because of his daily observation of their condition.

"When wilting or any other evidence of lack of readily available moisture is hard to detect in the trees themselves, the best method by which the grower can decide when this condition is reached is by watching some of the broad-leaved weeds which may be left as indicator plants in various places in the orchard. Generally, such weeds are deep-rooted enough to indicate by their wilting a lack of readily available water in the soil occupied by the roots of the trees."

Tobacco is a high-priced, heavy investment crop which certainly can make profitable use of irrigation. H. M. Ellis, extension agricultural engineer of North Carolina, said, "As a rule of thumb, tobacco should be irrigated when the crop is set and also from the time it reaches knee height to early bloom stage." This finding is supported by work done by Dr. J. H. Lillard, professor of agricultural engineering research at Virginia Polytechnic Institute, who adds, "The results of our study indicate that significant economies in water utilization and irrigation operation costs can be attained by restricting the application of all or most of the water to the crop's critical growth period. While yields may not, in all cases, be maximum attainable with full season irrigation, they are usually greater per unit of water applied. Such irrigation procedures have the additional advantage of permitting use of irrigation equipment on multiple crops.

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# Feeding Silage in the Summer

By Charles F. Rogers

## Supplement or replace pasture with silage to build milk and beef production.

"FOR YEARS, we've been set up for winter feeding of silage," said Joe Mikolz of Valent, Pennsylvania. "Two years ago we realized that with no changes whatever we had everything needed for summer feeding of silage, too. We just closed our pasture gates and kept them closed. The program is paying off."

Joe Mikolz and his brother John operate a number of dairy farms a few miles apart. As yet there are no silos on one recently-acquired farm. Two upright silos are contracted for, to be erected during the summer. In the meantime, so convinced are the brothers of the advantages of summer silage, they are hauling it from the home farm to the new place by hand-loaded trucks.

Summer feeding of silage in place of pasturing is a growing practice among dairymen. It is being combined with, and in some instances is replacing, green feeding in beef finishing. The advantages frequently cited for green chop are equally true of summer silage feeding.

(1) Per acre carrying capacity is greatly increased, sometimes more than doubled. Fouling and trampling of pasture is stopped.

(2) Rations can be controlled in both quantity and quality.

(3) Crops like barley and Sudan grass can be fully utilized as livestock feed partly as green chop and partly as silage.

(4) Crops harvested at their nutritive peak can be used later. Those used as green chop give greatest production per pound dry weight.

(5) Cattle are centrally located. They need not be rounded up for milking or care. It is easier to observe and manage heat periods, diseases, accidents and insect infestations. Shade and water can be provided conveniently.

(6) Fencing, fence row maintenance and cropping limitations imposed by fences disappear.

(7) Bloat is reduced or eliminated.

(8) More use is realized from the harvesting, storing and feeding facilities.

Many of these advantages apply to green chop, of course, but Mikolz said, "With green feeding you never get a holiday or a Sunday off. Of course, as dairymen the seven-day milking week is the neck yoke we must bear, but by feeding silage in summer we don't need to take the field chopper out on Sunday. And we don't have to cut crops for the daily feed in rainy weather.

"It's hard to say which is more work, making silage or feeding green chop. There's the extra labor of hauling manure, but you can spread it where it is needed. On pasture, the cows drop most of it under trees where it's wasted."

Compared to pasture, summer silage feeding racks up considerably more man-hours of work, depending on the degree of mechanization of the feeding operation. As the Mikolz brothers point out, they are not in business for convenience. They find the work justified in increased milk checks. "In the spring," John said, "we don't get the usual spurt of extra milk that comes when the cows are first turned out. But at that time, the price of milk goes down. Now, our winter and summer production are nearly equal. We get more total milk and more of it when the price is high."

### Cattle Hate Change

In the spring, a change from a mediocre to a good ration for cattle is all too common. Silage gets down to the soggy, sour heel, as a pipesmoker would say. The cattle limp along on poor feed, then suddenly they are turned loose on acres and acres of inviting but immature and washy grass. They eat so much pasture that their appetite for more substantial feed goes down. It is a rare pasture that can supply a high-producing cow with as much nutrients as she needs. If she has gained any weight during the winter, she begins to lose it on early, succulent pasture. Her bodily reserves are called upon to aid in the production of the increased milk flow stimulated by the pasture. The flush of milk sounds good in the milk pail, but it also tends to reduce subsequent production, especially when pastures begin to dry up.

A cow is a creature of habit. She produces more milk or beef when she's in the groove. The same paths, the same stall, the same place at the feed bunk, the same hour of feeding, and perhaps most important, the same feed, are what help a cow behave better, grow better or give more milk. Constancy of ration is essential. Changes should be rare and slowly introduced.

With intensive livestock agriculture, a summer silage program is more efficient than pasturing. Nearly 90 per cent of a meadow crop, cut for silage, can be used as feed. A 40 per cent utilization of a pasture crop is high. Pasture quality and composition constantly change. Control of intake on pasture is difficult. Cows cannot always be trusted to eat what is nutritionally best for them. Production and growth, our aims in livestock farming, require more than pleasing an animal's palate. Silage offers a greater control of feed, in kind, in amount, and in quality than does pasture.

How can you get a cow to eat silage when young, green pasture beckons? Except possibly for several weeks in spring, when the odor of lush, tender forage tempts cattle, there is no problem. In general, cattle prefer good silage to indifferent pasture.

With summer silage, hay and grain are also needed, as in winter. Some cows cannot get all their nutrient needs from silage alone. An adequate amount of hay is further assurance that enough dry matter will be provided to meet each cow's requirements. Silage need not be the only wet feed. Some farmers like to combine silage with green chop in summer, others prefer a limited access to pasture. A. B. Baker of Stark County, Ohio, plans to blend green chop and silage together in a mixing hopper from which augers distribute the mixture to feed bunks. The green chop offers fresh feed, while the measured amount of silage of a known quality guarantees a high nutrient intake. The amount of green material is increased slowly, so there is no abrupt change in rations.

So much for the cow. As for the field operations, the time to feed green chop is

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# JIM,

*By R. J. McGinnis*

***The mysterious powers of Sam Van Arsdale's Llewellin Setter baffled scientists. His secret may never be solved.***

# *the Wonder Dog of Sedalia*

IT WAS A hot autumn day in the Missouri quail country and Sam Van Arsdale headed for a patch of woods along a slope at the far edge of the field. He caught up with his dog, Jim, who was working toward the woods, and called the dog to him. "Let's find us a hickory tree and rest awhile," he said to Jim. "Do you think you could find us a hickory tree, Jim?"

Sam Van Arsdale, as most hunters do, often carried on a conversation with the dogs he hunted. The hunter expects no response from his dog, except perhaps a wag of the tail, but this time Van Arsdale got an unexpected and even startling response from Jim. The dog raised his ears, looked at his master, and trotted ahead to a hickory tree. He placed his paw on the tree and looked at his master again.

Somewhat amazed, but not fully realizing what Jim had done, Van Arsdale half seriously said, "Well Jim, if you know so much about trees, show me a pin oak." Jim studied the trees for a moment, then trotted a short distance away and placed his paw on a pin oak, distinguishing it from the other varieties of oak in the woods.

The widow of Sam Van Arsdale, a frail old lady of 85 now living in Sikeston, Missouri, told of this incident in an interview early this spring.

"Mr. Van Arsdale, very excited and puzzled, drove quickly home to tell me. 'Jim did something this afternoon that has me guessing. He knows every tree in the woods and can find them for me,' he said.

" 'Sam,' I said, 'you are pulling my leg.'

"He was annoyed that I doubted him.

" 'You get in the car and I'll show you.'

"We went out to the strip of woods where Mr. Van Arsdale had been hunting and I never was so surprised in my life. Jim identified seven trees, one after the other. I didn't see any cedars in the woods and asked Mr. Van Arsdale to have Jim find one. He did that too; ran straight to one about two-hundred yards away, a little old thing we couldn't see."

During the years that followed, Jim's super-human powers were revealed in countless well-authenticated cases. Each day, it seemed, some new and mystifying trait was discovered by his master. He became known throughout the country and became the subject of newspaper and magazine articles. He identified objects and persons; he understood concepts as well as words; he foretold the sex of babies and kittens; and he predicted the results of baseball games, horse races, and elections.

One of the highlights of his career was his appearance before the Missouri Legislature. One day in 1933 the Missouri Legislature recessed for a very special and unusual occasion. Senators and representatives gathered in the chambers to pay tribute to Jim, The Wonder Dog of Sedalia. Jim sat calmly beside his master as the lawmakers and a gallery of several hundred took their seats. With the exception of a few who had previously seen the dog perform, the spectators were frankly skeptical about the amazing feats attributed to him. There is some trick in this, they said; no dog could do what this dog is reported to have done.

### The Morse Code

For an hour and a half Jim was put through his paces. Questions and requests were given to his master who passed them orally to Jim. "Find the man who is known as the Beau Brummel of the legislature." Jim left the platform, passed down the aisle and placed his paw on the man. "Jim, there's a man with a moustache in the fourth row of seats. Find him for me." Jim made no mistakes; unerringly he carried out the requests of his master. In a final attempt to trip him up, one of the senators suggested that the state telegrapher be brought in and a message be given to Jim in Morse code. The senator whispered a message to the operator. "Jim," said Van Arsdale, "listen carefully now and do what it says." Jim watched the instrument intently while the message was being tapped out. When it was finished he walked down the center aisle of the room to the rear, edged down a row of seats, and placed his paw on the knee of a man.

Mrs. Van Arsdale remembers well the drama of the incident. "There were only two men who knew the question," she says, "the senator who whispered it to the operator and the operator himself. Mr. Van Arsdale did not know the Morse code, so he could not have given Jim any sort of a sign, as many people thought he did in similar cases. When Jim identified the right man there was a deep silence in the room. Then the telegraph operator sprang from his chair and shouted, 'My God, he has done it!' The message was, 'Point out the senator who sponsored the race horse law in the legislature.' "

Jim was a pure bred animal, a black and white Llewellin Setter. He was related to one of the great dogs of dogdom, Candy Kid, famed wherever setters are known. He was born on a Louisiana farm in 1925, and

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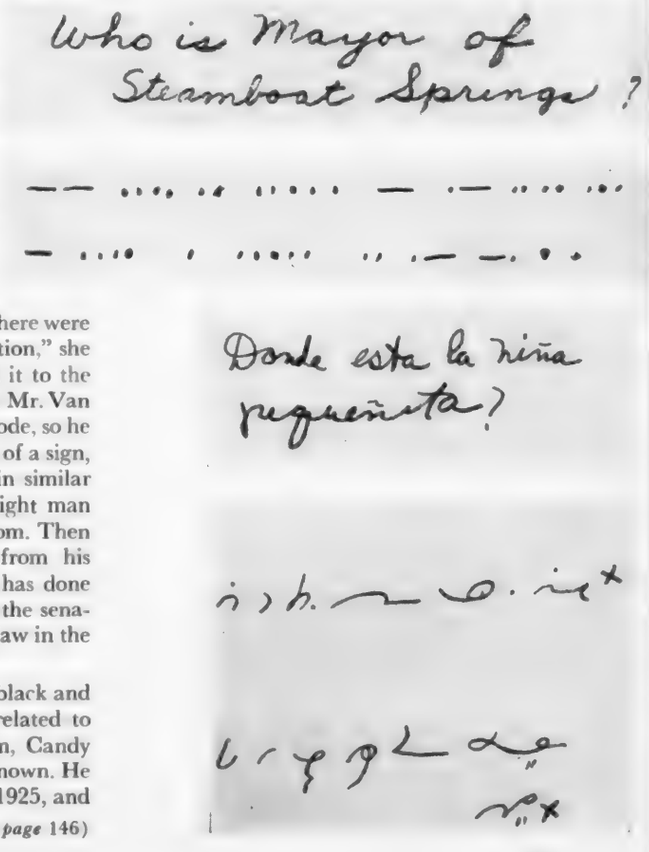
**Sam Van Arsdale (above), Jim's master, could not explain his dog's strange ability. Below are questions read and answered by Jim: English, "Who is the mayor of Steamboat Springs?"; Morse code, Who plays the piano?"; Spanish, "Where is the little girl?"; shorthand, "Who is chewing gum like a horse?"; and "Show the replies they have from Saline County."**



### The Pen: For Life

A litter of pigs is born, raised and finished in the same steel-sided pen. They never move outside the eight by fourteen-foot area until they are slaughtered. Curved farrowing rails are removed with the sow at weaning, but the same feeder and watering device serve the whole life of the litter. The feeder is adapted to hold both sow and pig starter feeds, and the water fountain is a simple spout, which the pig operates by bending the rubber nozzle. The building is well insulated and ventilated, and the floor of each pen is sloped to remove much of the manure automatically. The rest is flushed out by high-pressure water. An overhead auger fills the feeders separately, if necessary, from bulk storage or from a hopper. It is estimated one man will be able to manage six separate 24-sow units.

# THE PEN: FOR LIFE

**This pig was a fast learner. Fifteen minutes after the new drinking fountain was installed, he was using it properly, although his first attempt was to push it with his nose, let it run awhile, and then drink from the floor.**

"THE ONE THING," said Don Fisher, "that it took me so long to realize, was the simplicity of the system. We have passed through a portal in swine production—taking the gates and shovels out of hog-keeping." Fisher was speaking about the Conner Prairie system of hog production. He is hog manager of the Noblesville, Indiana, farm.

The litter is born and finished in the same pen. The "Farrow-to-Finish" system uses a galvanized steel pen in a well-insulated building, on a specially sloped floor to aid manure removal. The complete unit is to be manufactured by the Chore-Boy Manufacturing Co., of Cambridge City, Indiana. According to preliminary estimates, it will retail for about $10,000 for a 24-sow unit.

Each eight by fourteen pen is divided. An eight by ten foot space is the exercise area. The four by eight foot compartment across one end is the farrowing crate fitted with removable curved farrowing rails. To the other side of the partition is fastened the feeder. On either side of the feeder is a door, connecting the farrowing crate and exercise space. "The purpose of the doors is to close off a small draft-free compartment so the pigs stay comfortable," said Don Fisher. "At farrowing time you want both doors shut to keep the little pigs in. At that age they don't know where they're going."

Within these galvanized steel walls the litter spends its entire life. The sow enters the pen a week before farrowing, to settle down. She gets used to the curved farrowing rails with a door at each end. She lies with the curve of the rails, or, at least, she should. The floor in the farrowing compartment is insulated with an inch-thick layer of styrofoam one and one half inches under the concrete. The difference is amazing—it is much warmer to the touch, although there is no heat under the floor. There is no styrofoam under the exercise area.

The litter will arrive, via the usual channels, and will stay mostly under the heat lamp for the first few days. The sow will go out to the feeder and for water. The herdsman, if he wishes, can close either door behind the sow. This forces her to return by the door that is open, and so she reverses her lying position, and turns uppermost the other row of teats. It may be that a mechanical device could make this automatic, with the sow opening one door and closing the other at the same time.

When the litter is weaned, it is the sow that leaves. At four weeks, the litter is left alone in the pen. The farrowing rails are removed—a two-minute, wing-nut job. The sow feed is taken from the feeder, and pig feed put in all the compartments. The water fountain is unchanged.

### Novel Waterspout

The water fixture is very neat. It is simply a rubber spout at the end of a water pipe, which flows as the hog bends it slightly sideways. This water saver nozzle is used at filling stations for auto radiators and is cheap and efficient. The rubber spout is like a hose nozzle and the hog quickly learns to hold it in his mouth and drink. There is nothing to clean out, and nothing to freeze. They are hoping to develop a similar one for cattle.

Don Fisher believes the hogs like the spout better than water bowls. "They like the flushing of the water in their mouths. Even newly weaned pigs learn to operate the spout within minutes of replacing an old-style water bowl with the rubber drinking fountain."

One feeder serves the life of the litter—and feeds the sow as well. It is divided into two compartments, and is a three hole design. The sow feed goes in one compartment. The other two lids are fastened half open with a strut of metal so only the litter can reach the pig starter ration within. At weaning, the strut is removed, and the feeder works perfectly for the growing hogs. As it is divided, it could be used for grain and a supplement, but Conner Prairie uses complete ground mixed feed in both sides.

A simple auger fills the feeders from a bulk tank outside the building. The auger can be used to measure the amount of feed going to each litter, to check on their feed consumption. Each outlet can be opened or closed, so all of one batch of feed can be directed to one litter if necessary.

Each 24-sow unit has its own high pressure water hose, to wash out the excess manure through a floor level hole at the rear of

**A pregnant sow settles down in the farrowing crate. The curved rail makes it easier for her to lie towards the heat lamp, so the litter will lie under the lamp. One of the doors to the exercise area is visible (top center). The other is out of sight (bottom left).**

each exercise area. With the auger, automatic water, and a hose to flush out manure, there should be no need to enter the pen while the litter is there. This is a step forward, both for labor and sanitation.

After the sow has left, the litter remains in the pen until they go to slaughter. They go all together; no provision is made for runts. Fisher believes the dawdling pig will never make market weight profitably—and should be sold. Equally the size of the litter doesn't affect the system. A small litter—or a large one—stay in the same size pen. (A litter of ten would allow 11 square feet per hog.) Fisher doesn't believe that mixing pigs to even-off litters is good practice. "There is enough evidence against it to make it debatable," he said. He feels that mixing litters with different resistance levels might cause disease in both litters.

Tail biting could be a problem—as it can be in all confined systems. "One pig goes stir-crazy and finds it fun to go around biting all the tails. I don't think it's cannibalism as you find in poultry," said Fisher. "Not all the pigs do it."

### Development of the System

Another farrowing house was needed at Conner Prairie, and Tillman Bubenzer, the general manager, turned a long low building over to the hog operation. From the local lumberman they bought sixteen precut farrowing stalls and put them in the building. There was a regular farrowing stall with a small pen at one end. In the pen, they experimented with a sloped floor, to aid manure removal. They found quite a steep slope was necessary (seven inches in four feet) if the pigs were to tramp out some of the manure.

The sows farrowed, and the pigs grew and were weaned, and by all standards, should have been moved. But Bubenzer and Fisher decided to let them stay.

Though the litters varied in size from four to fourteen at 154 days, the pens were all six foot by seventeen feet. (10 square feet per pig for a litter of 10.) The wooden farrowing rails were unbolted and removed, and the litter slept in what had been the crate. They manured at the bottom of the exercise pen.

An auger was installed to fill the feeder in each pen. To control the auger from anywhere in the building, they installed a movable switch. The switch which starts and stops the auger is on a long cable, which is coiled like a big spring. Each ring of the coil is hung on a hook, which slides on a steel wire stretched overhead. The result is like a shower curtain. With a slight pull the coiled "spring" stretches and slides down the supporting steel wire. It pushes back just as easily. It can't tangle, and it saves a lot of walking.

### Steelsided Pen

The success of these wooden farrowing crates and pen in an existing building led to the development of the steel pen by Chore-Boy and Conner Prairie. They worked out the pen which is now available. The material now used is a panel made by glueing two sheets of galvanized steel outside a honey-comb of cardboard. The edges are capped by steel channeling. The resulting panel is water and corrosion proof, and unbelievably strong and rigid, surprising when you remember the middle is cardboard. It is easy to clean, and a good insulator.

The first pen of this new design was shown at the Indiana State Fair in 1958. It was the prototype for the unit of pens built at Conner Prairie this year, from which the first litters are now almost ready to market. Paul George, of Chore-Boy, was the nuts and bolts man. Up at Conner Prairie more than anyone else, he was the trouble

shooter for development of a working system. The six-sow unit is strictly the smallest unit size. "The units are still being changed as improvements are found," said Tillman Bubenzer. "The idea is certainly far from fully developed."

Although the equipment could be put inside almost any building, those who have worked with it are anxious that the floor and the pen be built together. The floor has a pronounced pitch for manure moving through the small hole in the back of the pen. Fisher emphasized the floor is an integral part of the pen, and said, "We hope a farmer will use the whole unit, because we're worried some farmers will install the pen with the wrong floor, or no floor at all. Then, when it doesn't save him any work, he'll condemn the whole unit, crate, pen, and all." The building is also an essential part of the system. It must have insulation and proper ventilation.

Pen cleaning is an easy job. The exercise area has a V-shaped floor. At the end of the pen, where the hole is at the bottom of the V through the wall, the slope is seven inches in four feet from the side of the pen to the middle. The V flattens out towards the middle of the pen, and the floor is straight across at the feeder. There is a slope down the long side of seven inches in the 14-foot length.

Much of the dirt is removed by the pigs themselves, and by the overflow of the water fountain. A quick flush with the high pressure hose removes the rest very easily. The high pressure water should be carefully used—to wash the floor, not the pigs. So far, dampness has not been a problem.

"This floor," Fisher said, "has a new purpose. It no longer is to stand on and fasten things to. It's going to be used to move liquids. If we can save a man from getting into that pen, he can keep hogs and still dress and smell half-way decent. Furthermore, you spread less disease. And lastly, if we have figured a way to handle manure automatically, we can use our labor for animal care—where we really need it!"

When the manure is pushed or flushed out of the hole, it falls into a round bottomed trough which is electrically heated to prevent freezing. The trough leads to a large septic tank. Liquids run from this, but the solid matter is removed periodically.

### Compared with Other Systems

The building is quite expensive—although compared to other housing providing the same climate control it is cheap. But the insulation is necessary, as the building is first a farrowing house, and needs insulation and mechanical ventilation. This means the hogs spend all their lives in a high-cost building. In a competing three-building set-up, the pigs move to low-cost housing after weaning. The three building system is being recommended by every major university today. The farrow-to-finish pen replaced farrowing house, nursing shed, and finishing pad with one building. In either case, some housing is needed for the sows during gestation, and for the boars. This housing could be the same for either system.

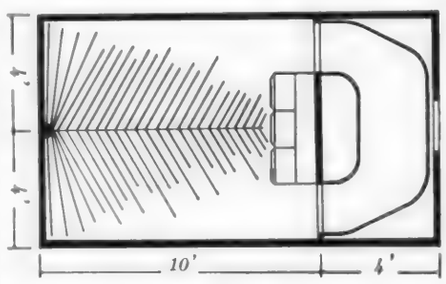
With the farrow-to-finish system the pigs are never moved. Bubenzer enlarged on this. "I am quite certain in my own mind that by avoiding the stress of moving, feed conversion can be improved. I think most other farmers will agree. Similarly, if a sow is comfortable, her milk flow is at its best, and you save the most pigs. She can be comfortable in our pen." Many farmers will recall the old rule of thumb that a move may lose a week's gain for a hog.

Actual feed conversion figures are available only for the first wooden-crated confinement unit at Conner Prairie. Two groups of 170 and 171 crossbred pigs, all farrowing, in early summer, were tested. One group moved out after farrowing to outside stalls with water sprinklers for cooling, averaged 193 pounds at 154 days, and took 294 pounds of feed per hundred pounds of gain. The group of 16 litters which remained in the farrow-to-finish pens, with no sprinklers, weighed 196 pounds at 154 days, and took 276 pounds of feed per 100 pounds of gain. However, these are the first and only figures available. No one can say just how significant they are.

Some systems use no bedding, perhaps from preference, but in some cases, slatted floors make bedding impossible in the farrowing crates. Jim Sheldon, herdsman at Conner Prairie, prefers bedding for sow comfort, and likes the peanut hulls they have been using. "They are highly absorbent, soft, and dry out on top quickly," he said. "We only use the hulls for five weeks, then nothing for the rest of the litter's life."

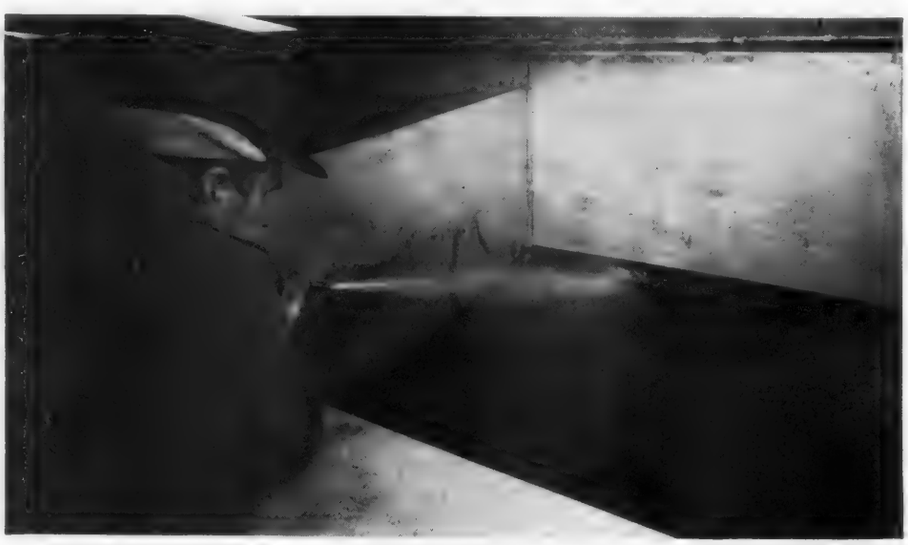
The farrow-to-finish system saves equipment. The farrowing rails are cheap compared to a conventional crate, and the use of a single water fountain and feeder for life cuts costs.

The 24-sow unit is extremely simple compared to other systems. With 12 pens on either side of a central walkway, a septic tank on each side of the building, and a small house at one end to house the bulk feed tank, and perhaps an isolation pen, it is also compact. Don Golay, of Chore-Boy, estimates four such units to be a one-man operation, but Jim Sheldon, the herdsman at Conner Prairie, thinks he could handle six such units—or 144 pens. Sheldon operates the unit at Conner Prairie, and has had as much working experience with the pen as anyone.




One twenty-four sow unit could only produce two batches of pigs a year—six months apart — as it would be unwise to have pigs of different ages in the same building. But six of these units would give monthly farrowing dates —one man could handle multiple farrowing.

(*Continued on page* 128)



**The pen is cleaned by Don Fisher (left) with high pressure water. He keeps the pigs in the farrowing compartment while he does this. The drawing (above) shows the area of the floor which is sloped towards the hole at the back of the pen, to aid manure removal without mechanical help. The litter (right) is ready to wean, the sow will soon leave, and the rails will be removed. The peanut hulls are only used while the litter is young. In this pen an old-style water trough remains. The loop from the roof is electric cable for the feeding auger.**

FARMER FEEDER

# any way you look at it
# Grain Moisture is Money

By Kenneth A. Harkness

BASICALLY, good farm management involves but one thing: the ability to make the right decisions. And every new departure in equipment and techniques brings with it new problems and a pressing demand for a new set of decisions.

Picker-shellers and crop dryers are among the latest devices to cause a farmer to scratch his head as he tries to determine at what moisture content it is best to harvest his grain and whether it will pay him to put his corn through the dryer. The charts and tables presented here are an attempt to help him make these decisions as quickly and accurately as possible.

The one on the opposite page provides the answer to the question, "Will it pay me to dry my own corn?" It assumes that the grain in question is shelled and is intended for the cash market. The final decision is based upon the interplay of four factors:

(1) the original moisture content;
(2) the local market discount;
(3) the existing market price per bushel;
(4) the cost of drying.

This last figure (the cost of drying) each farmer must determine for himself on the basis of his own operation. He alone is in a position to know what his fuel, his labor, maintenance and depreciation will total, or what a custom job will cost.

### How It Works

To use the chart locate the moisture content of the corn on the vertical scale, "Per Cent Moisture Content." With a straight edge run a line to the left perpendicular to the scale terminating at the diagonal line corresponding to local market discount per bushel for each per cent above 15.5. From this point drop a line vertically to the scale, "Total Market Deduction for High Moisture in Cents per Bushel." This is the total market deduction per bushel.

Then, on the right side of the vertical scale run a line from the per cent moisture content to the diagonal line indicating the local market price per bushel of shelled corn. From there drop a line to the scale, "Shrinkage Value in Cents per Bushel."

Subtract this latter figure (Shrinkage Value) from the Market Deduction and the result is the "Margin for Drying" in cents per bushel. If your costs are less than this you can make money by drying. If they are greater there is no point in drying.

The arrows show the working out of a specific example: The current market value of No. 2 corn (15.5 per cent moisture content) is $1.20. The local discount for high moisture is 2 cents for each per cent above 15.5. The moisture content is 27.5 per cent.

On the left side of the scale the arrows run over to the 2.0 cent line then drop to 24 cents on the horizontal scale. On the right side the arrows run to the $1.20 line then drop to 17 on the horizontal scale.

The Market Deduction, 24 cents, minus the Shrinkage Value, 17 cents, leaves 7 cents as the Margin for Drying. If this man's drying costs are higher than that, he had better not dry. If they are less, he can make money by using the dryer.

Note that if the market deductions remain the same, but the market value of the corn increases, the margin for drying becomes less; because as the market value of the corn increases the shrinkage value increases proportionately.

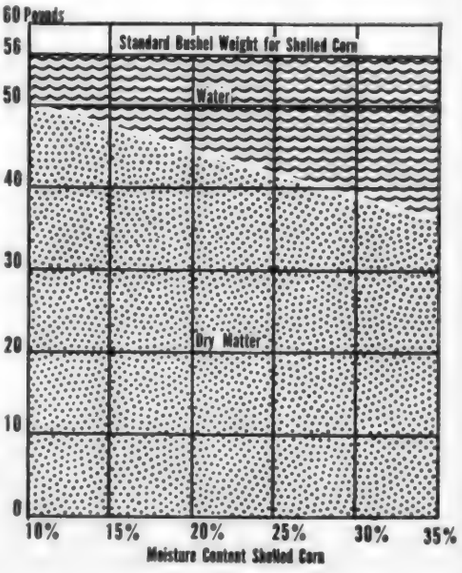
If the moisture discounts are unreasonably high it will usually pay to dry. The discounts assessed at elevators have several purposes. Primarily, they are an attempt to equalize the value of the dry matter in lots of corn of varying moisture content. A bushel of shelled corn (56 pounds) at 15.5 per cent moisture content (the standard for No. 2 corn) is made up of 8.7 pounds of water and 47.3 pounds of dry matter. But a 56 pound bushel of 23 per cent moisture corn has 12.9 pounds of water and only 43.1 pounds of dry matter. Thus, if a bushel of 15.5 per cent moisture corn is worth $1, the 23 per cent moisture corn, simply on the basis of its reduced dry matter is worth 8.9 cents less. This moisture-dry matter relationship is shown in the chart at right.

Besides this the discount takes into account the cost of drying, and assesses a cost to cover the risk and inconvenience involved in handling and transporting the wet grain. This latter portion of the charge is the factor which gives the grower his profit margin in drying.

Table 1 (page 122) is another aid in determining how to handle your crop at harvest time. If you know the moisture content of your crop—corn, soybeans or wheat—either standing in the field or after harvest, you can determine what its equivalent value is in No. 2 corn (15.5 per cent moisture), No. 2 soybeans (13.5 per cent moisture), or No. 1 wheat (14 per cent moisture).

The table also shows the losses involved in drying grain below these standards and in combining soybeans on a dry day when they may drop to as low as 10 per cent moisture. Drying shelled corn down to 11 per cent would leave you only 94.9 per cent of the grain you should have. You have that much less weight to sell. On a 1000-bushel lot you would lose 51 bushels. At only $1 per bushel this is enough to pay for a moisture tester in a few short seasons.

(*Continued on page* 121)



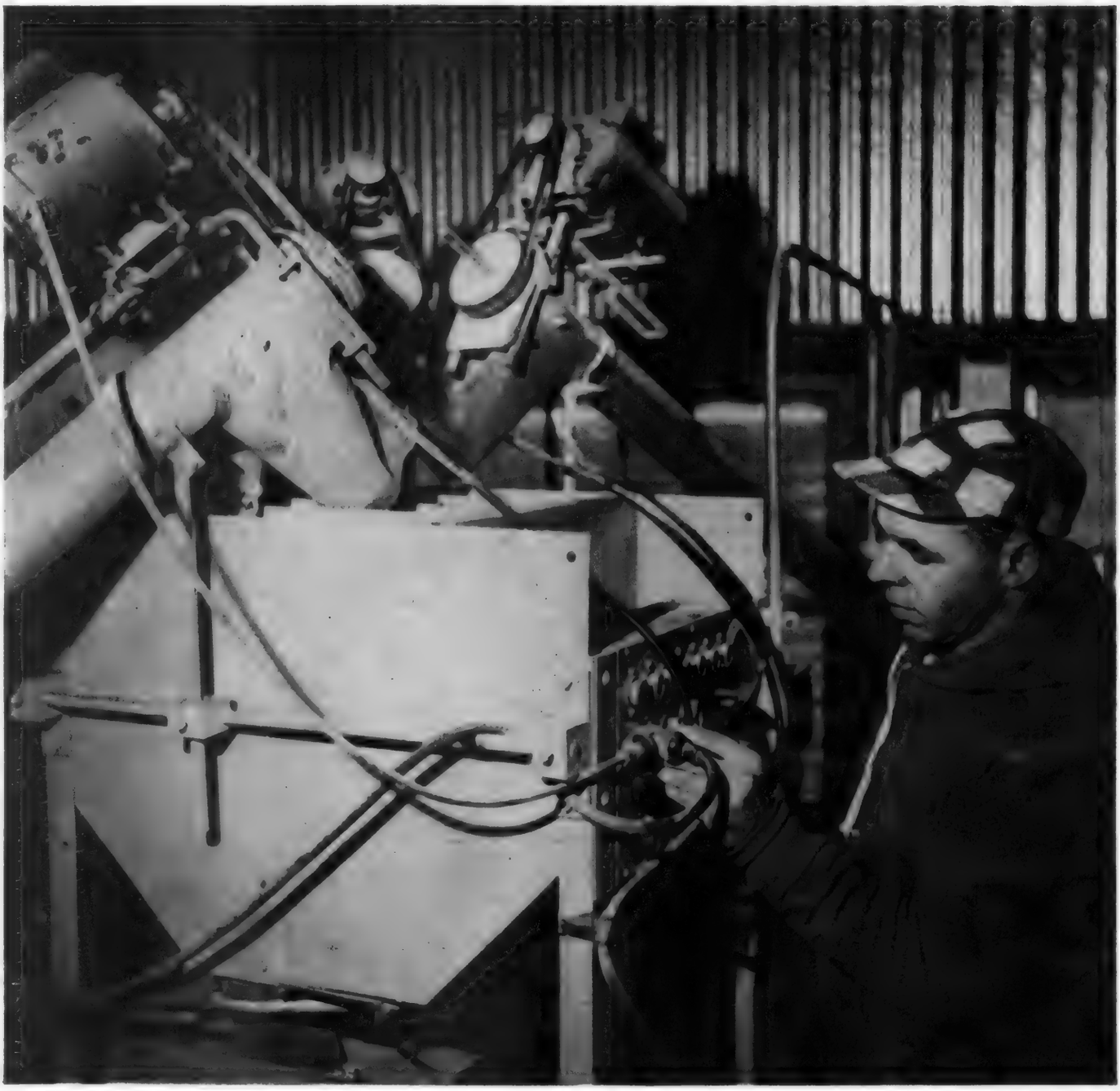
## Will It Pay to Dry Shelled Corn?


Moisture Content
35%
30%
25%
20%
15%
3.5
4.0
4.5
5.0
.60 .55 .50 .45 .40 .35 .30 .25 .20 .15 .10 .05 0
0 .05 .10 .15 .20 .25 .30 .35
Shrinkage Value in Cents per Bushel
Total Market Deduction for High Moisture in Cents per Bushel
Margin for Drying (cents per bushel) = Market Deduction — Shrinkage Value

If you know how much per bushel it costs to dry your shelled corn this chart (right) will show instantly whether drying will be profitable. Its use is described in detail in the text. The other chart (left) shows the moisture-dry matter relationship for a 56-pound bushel of shelled corn ranging in moisture content from 10 to 35 per cent. At 15.5 per cent moisture the bushel has 8.7 pounds of water, 47.3 pounds of dry matter. At 30 per cent moisture it has 17 pounds of water, only 39 pounds of dry matter.

Continuous, automatic use
of a small capacity mill to grind feed
makes ration mixing cheaper.

# Store, Grind, Mix, Feed, and Save



**An automatic feeding system on the Warren Frye poultry farm. Frye (left) adjusts the Mix-Mill which soon will fill automatically the turkey feeders (above). A chain circulates feed in the pipe, and tubing will lead the meal to the circular feeders. The bags shown will be eliminated when the downspouts are installed.**

PLANNED FLOW. That is the two-word telegram to a farmer who is building a feed or grain handling unit.

The importance of "planned" is obvious—but this calls for special planning, before an auger is set, or a bin is built. The planning determines where an operation is heading, and where it might be when the bins and augers are wearing out. If it was planned well, you may replace the same machines. If you didn't plan, or planned badly, you will have to sooner or later, and later will cost you more money than sooner.

The "flow" is different. Five or so years ago, flow wasn't the word. The word was batch. Because a progressive farmer, who was ahead of the field, and installed a granary in his barn—or built a new building—had a batch mixer. That means each feed component is measured out into a bin, ground in a large hammermill, and moved to a mixer. Then the next batch of feed is put through the cycle to the mixer. And so on. The mixer—powered by perhaps a 15 horsepower motor—does a swift job of producing smooth, homogenous meal. An auger wagon takes the feed to the hogs.

Such an installation is fast (3,500 pounds of grain ground in 20 minutes) and it gives a quality product (batch mixing is the best) and the big, heavy equipment will last far longer than smaller installations. But it doesn't flow. And it isn't automatic. It saves labor by doing the work fast—using big machines.

The alternative is flow. You flip a switch, set a few dials, and a thin trickle of feed circles up and drops into a self-unloading trailer. For two or three or ten hours it trickles, the noisy mill and the purring motors and the scratching augers. But nobody watches the ton-an-hour flow, and it cuts off automatically when the trailer is full. The components of the feeds are not as accurately measured as when they were weighed, but it's good feed for all that. And the big, big difference is that capital investment. Small motors, small mill and flow are cheap—and a lot of farm labor can be used in its erection.

One way to get into the picture is to see what a few go-ahead farmers have done, and then talk to the professionals. Bruce A. McKenzie is our professional. A full-faced, tall, balding young man, who did a study of feed-handling systems at Michigan State University, he is now at Purdue in the unusual position of part researcher, part extension man—a useful combination. He was interviewed last month.

The first question for the expert is "Use my old buildings, or build some new ones?" Said he: "You must be extremely cautious when you convert a building into a granary. The cost of going new as opposed to remodeling is probably less with grain storage than with many other farm enterprises. Grain is heavy, and imposes rough structural requirements on a building. Analyzing the strength of a barn is expensive—and an engineer tends to over-design, to be safe, when he doesn't know the actual strength of the present building. You may end up salvaging only the shelter."

Many times, existing buildings can be used. It may be part of the plan to replace buildings as they age, so their probable life is important. You must know what you hope to be doing during the life of the system. You can't afford the cost if you find it will not fit your farming in five years.

The second big decision is in grain storage. Wet or dry? McKenzie explains: "The tendency when a dry grain facility is planned is toward a completely prepared feed. This means a farmer is faced with moving grain out of storage 365 days a year. This is the critical consideration in planning. Most farmers move grain *into* storage efficiently. Harvesting is telescoped into a few days, and puts a premium on labor. The pressure on getting grain *out* is never as great—a fellow can goof around all winter wasting time and never notice it.

"In getting the grain out of storage, you had better plan for processing, that is, feed mixing. Whether or not you process now, you had better be prepared to, so if your commercial service goes to pot you can adapt. Processing means bringing the feeds together to make a ration for livestock, so you had better begin by putting the buildings together. The biggest single problem in grain storage on most farms today is that we've got storage spread all over the farm. Our long-range objective must be to have these buildings together, so we can assemble the ration without putting grain on wheels.

"There never was a point to having wheels on a hammermill—except that storage was so scattered around—and the waste is just foolish. Bring your storage together—and if you're not processing now, leave space for the installation of a processing building.

"You can't do much about widespread farm layouts. They're fixed. But you can influence the arrangement through the additions. As you add new buildings they should be part of a long-time plan to bring coordination, and make a gradual transition from where you are to where you want to be, as you write off outmoded buildings.

"Some of the present buildings will be in the wrong place—and these you must relegate to a minimum reinvestment basis. You get as many miles as possible out of them, without putting anything back.

"Processing is what determines the layout of the combined facility," McKenzie emphasized, and his loud voice boomed in his small office as he went on: "Handling the materials before processing is more important than handling the feed after grinding. Before the hammermill there are three or four things to be mixed. Afterwards the feed is all the same and one pipe or auger or wagon is enough."

**Frye looks down the one-inch pipe which will carry feed up to 800 feet underground from his mill to the poultry houses by pneumatic conveyor. Air pressure and feed flow are carefully regulated to make an actual suspension of feed in air inside the pipe. It can turn corners without blocking. An Erietz vibrator (right) conveniently fits on the Decker mill. The vibrating trough (below the tank) feeds antibiotics or minerals onto the moving belt which leads to the mill.**

"High-moisture corn is more of a problem. Here you tend to feed direct, without processing. Hence the ideal is to have storage at the feeding site. It is simple to add the necessary supplements. But if you do this, you have two difficulties: First, to build economical storage, you prefer to put it all in one unit—say one 10,000-bushel tank. But it may be impractical to have enough animals in one lot to handle all this —you'd prefer two lots and two 5,000-bushel tanks, and up goes the cost. Secondly, if you assume that the tanks have a life of 15 to 20 years, there is a big question: 'Will you change to feed processing within the life of this building?' Remember the dry grain thinking on storage layout—all together. Right now I would not recommend a man that he consolidate high-moisture corn storage, but I'm faced with a paradox —he may find it necessary to process wet corn within the life of his facility.

"Although I believe high-moisture corn is the coming thing, there are still some points for the dry corn. Dry corn can be stored in a low-cost highly efficient building—and can be marketed as corn. High-moisture corn," laughed McKenzie, "can not be sold for Post Toasties—it's designed for cattle. And, Iowa State trials have shown we may be able to add enzymes to dry corn, and get the same improved results as wet corn gave in recent trials."

### Following the Plan

When the decisions are made—new or old buildings, wet or dry corn—the layout becomes more fun, like working out a model railroad, one farmer said. But an expert can still offer a few tips. McKenzie continues:

"Put bulk grain storage on the ground. Pick it up when you need it, with an elevator. The reason is simple. Bulk grain—and I mean large amounts—is emptied once a year. You can't afford to put it up in the air for one unloading. Empty it with a auger, or drag, preferably one which can be moved for use on several bins.

"You will find the most economical answer is to put a little hopper in the processing area, and spend the money on equipment to move grain from bulk bins up to that hopper fast and conveniently.

"The use of a flat bottom bin, with an unloader, is the alternative to hoppering a bin. A flat bottom unloader removes material that reposes on the floor. The hopper prevents material from reposing on the floor. The mechanical unloader can be made portable, for use on any grain bin, and the hoppering may be unnecessary. You leave the unloader in place till the bin is empty, then move to another bin. But with bulk supplement tanks, you may use a little from each every day. Then the hopper is the only sensible answer, it would be wasteful to move one unloader between the bins every day.

"One last thing, and then I'm through. There's not near enough flat storage. I mean grain stored on the floor of a clear-span rectangular building. Oh, there's a reason, I know. People tend to think flat storage is too big, but, believe me, it's not anything like as scattered as the storage they've got today. There is much merit in having some flat storage, say half, for example, and the reason is flexibility. Flat storage buildings can be used for other things when the grain has gone, whereas a bin is almost useless. Why put only half of the grain in flat? Because you have a good chance of getting this much storage clear for other uses. It can be cleared by mid-winter, and then used for fertilizer, machinery, or even livestock. You could use flat storage which still had grain in there, but it isn't as convenient or useful. The last reason is also a hedge. If you change to high-moisture corn, there is a good chance you will still have enough dry corn around to use your bins—if they are half your total storage. Then you use flat storage for something else. There," said McKenzie, "I'm done."

### Getting Things Done

Theory's fine, but each farmer wants facts for his farm. Where can he get bin sizes, auger loads and angles, mill output and hopper slopes? The dealer is usually the answer as he is backed up by the manufacturer. The local electric supplier may help. And the county agents and University extension men certainly will. But be careful. This is a new field, and there are agents who may be well-meaning, but not well educated in this new system-planning game. Be sure the man you pick has a good reputation, and some experience, and, best of all, the manufacturer's approval. No manufacturer wants to risk the reputation of his equipment by wrong installation.

Take a dealer like Duane Dahnert, partner in Waterman Electric at Waterman,

Illinois, a trained engineer, and a short, friendly-faced, top-rate planner. He has installed both of the small mills put out today —the Mix-Mill and the Decker mill. "I have laid out several systems," said Dahnert, "but they are all part of a program. We never seem to come across anyone with the idea and the money at the same time! The first thing usually is rewiring. We are going to 200 amps. and pole distribution. We put the meter on a pole in the middle of the set-up—including the house, which is still the heaviest overall

**The Frye layout has been planned for growth. The white-roofed processing shed houses the mill, and stores machinery. The storage clustered around it holds soybean meal, oats, corn and three premixes. The four bins together are additional corn storage. The turkey house is the shed at top left.**

user. Then we hope to sell the prospect the equipment as he needs it or can afford it. I spend a lot of time doing planning that doesn't get paid for, but I hope I'm building up my future prospects. This way, you know, I'm going to be sure I give a farmer the right plan, or he won't be back.

"Really," said Dahnert, "the only problem with these systems comes with nonflowing materials. Many bins are installed without agitators, but these are available and may be necessary in certain materials. It is difficult to handle high-fat feeds, as in some poultry rations, and there is no provision to add molasses automatically with these small-volume machines. Automatic addition of these components is a job for specialized equipment, available, but expensive."

### Help From Manufacturers

Mix-Mill is made by Belle City Engineering Co., Bluffton, Indiana. The Decker mill is made by the Decker Manufacturing Co., Rockford, Illinois.

The Mix-Mill uses four augers to measure out feed. The speed of each auger is controlled by a dial on the mill, and a fifth dial speeds up all the augers together, or slows them down. A single 2-horsepower motor drives the augers and the hammermill. Any one auger can be slowed down to mix 80 pounds into a ton of feed from the other three, and any auger can be stopped altogether—all controlled by the dials. The total output from the mill is about two tons an hour (think of that as 48 tons a day).

The Decker mill is a horizontal belt with vertical pipes feeding the grain onto the belt. The pipes may be raised and lowered. As a pipe is raised, more grain flows onto the belt, and to the mill. A one-third-horsepower motor drives the belt, and the hammermill has a separate two-horsepower motor. This mill will produce about two tons an hour. Of course, with either mill this depends on the size of screen used and the material being ground.

The Decker mill must have gravity feed built above it, the Mix-Mill has small hoppers as a part of the unit. The Decker mill has the higher output of the two, but it is harder to change the ration. On the Decker, the pipes must be raised, and then the new rate of flow measured by weighing the output of each pipe. The Mix-Mill adjustment is by a hand dial. However, for true accuracy, all mills should be checked by weighing the delivery at different settings.

Both mills have a limiting switch, if one ingredient of a ration stops flowing, the whole mill stops. Both have a control panel with a time clock to use for small batches of feed. Once started either mill is automatic.

The manufacturer of the Decker mill claims the cost of a dial adjuster for feed flowrate is not justified, as the present device is simple. He feels many farmers will seldom change their rations, and will have no trouble when they do.

An engineer from the Belle City firm, Vaughn W. Slack, explained, "These mills are easy to install—if there is overhead room for gravity hoppers two men can do it easily in three days. With auger feed from bins it may be even quicker. The fastest ever, I think, was a gravity unit finished in

(*Continued on page* 103)

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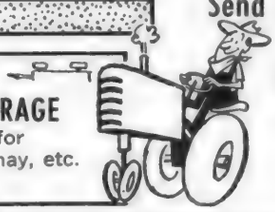

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See the new

**BRILLION HAY CONDITIONER**

on page 118.

### How to Blast a Stump

(*Continued from page* 38)

tip it over or blow it up."

In making a hole at the base of the stump Sutter uses a steel crowbar. He probes down through the roots on a 45 degree angle. If he hits rocks, solid roots or tight soil, he puts in a primer. This is one stick of powder, which he detonates with a six-second delay "so there is time to walk to the shelter side of the stump," Fred explains. This primer loosens up the ground to make a deeper hole. He cleans out the hole with a regular spade shovel with the sides rolled in to a 4-inch width. These sides help grab and bring out the dirt.

Sometimes it is necessary to use two or three primer shots on large 8 to 10 foot diameter stumps to get a hole 5 to 7 feet deep. If the soil is wet and heavy clay or loam it takes less powder. Rocky, sandy or loose soil takes more powder.

"Blasting a stump near a building or other no trespass structure takes a bit of doing," Sutter continued. "We call it two holing. We make two holes on opposite sides of the stump. This divides the charge. We tamp in only half the amount of powder used out in the open. That is, if the stump is large enough for 40 sticks we put in only 20, divided equally in each hole. We then bulldoze dirt around the base three or four feet high. This type of blast will break the stump loose and will not blow pieces high in the sky."

(*Continued on page* 84)

## cut feed costs with these NEW KELLY DUPLEX machines

**MIX 'N GRIND**

A complete feed mill operation in one low cost machine. One man can grind, mix and sack a complete batch of accurately blended formula feed in less than 20 min.—at lower per ton cost than ever before possible. Ruggedly built—it requires minimum space, is easy to operate, uses only two low HP motors. Made in 1, 1½ and 2 ton models. Satisfaction guaranteed.

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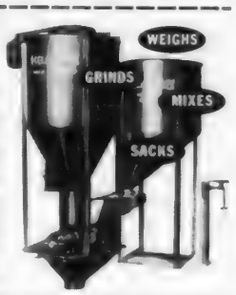


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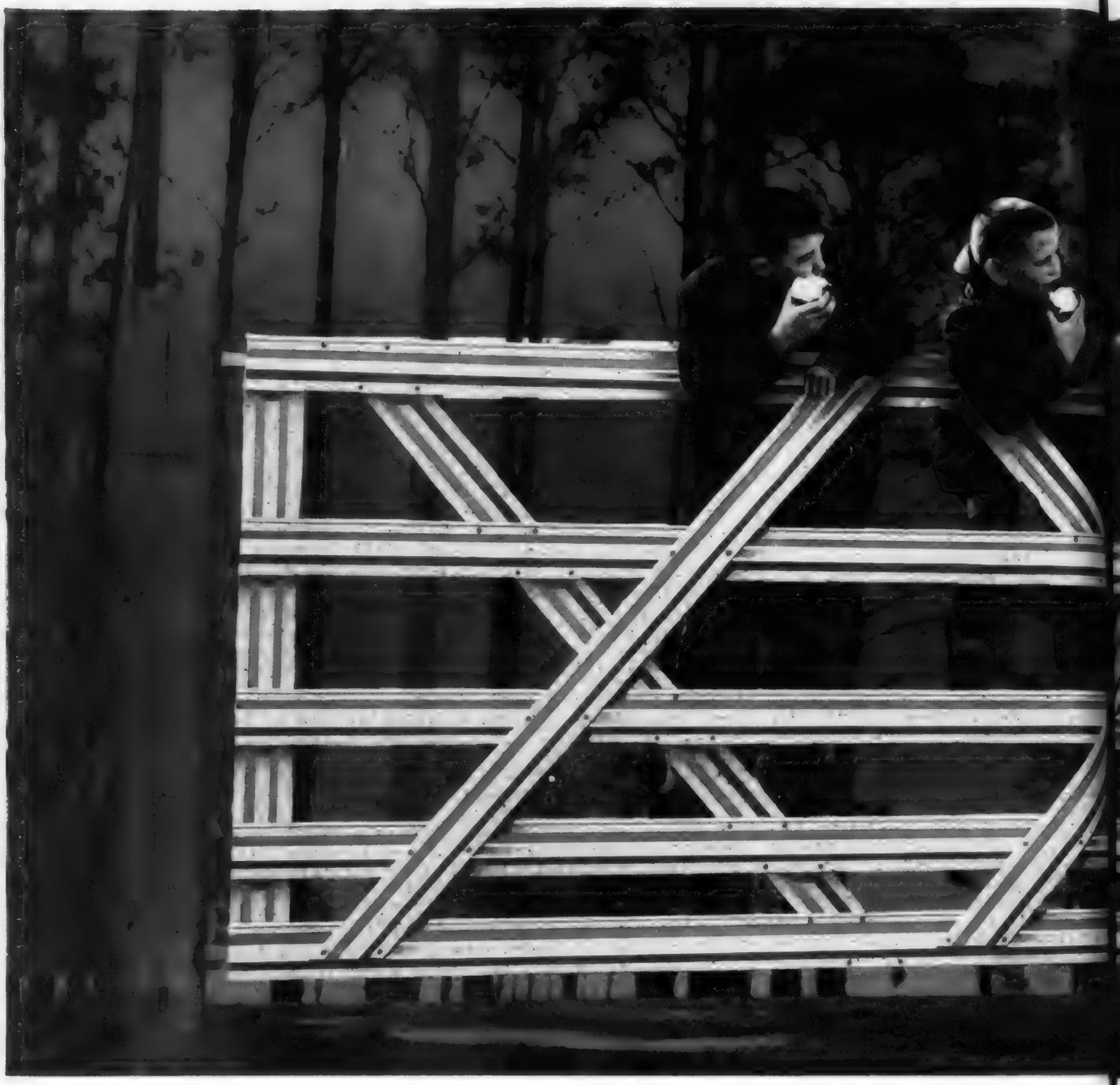

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Alcoa's agricultural engineers designed this gate with just one main idea in mind: durability. Gates must last or they aren't worth hanging. This Alcoa Aluminum Gate will last . . . year after year.

It will dress up your farmstead, too. Your show barn. Your stock pens. It's the best looking farm gate on the market and, what's more, it will stay good looking. Alcoa Gates never need painting or other expensive maintenance.

See the sturdy Alcoa Aluminum Gate at your farm supply dealer's first time you go to town. He has them for openings 10 to 16 ft wide, 52 in. high. There's a special 36-in.-high hog gate, too, if that's what you need.

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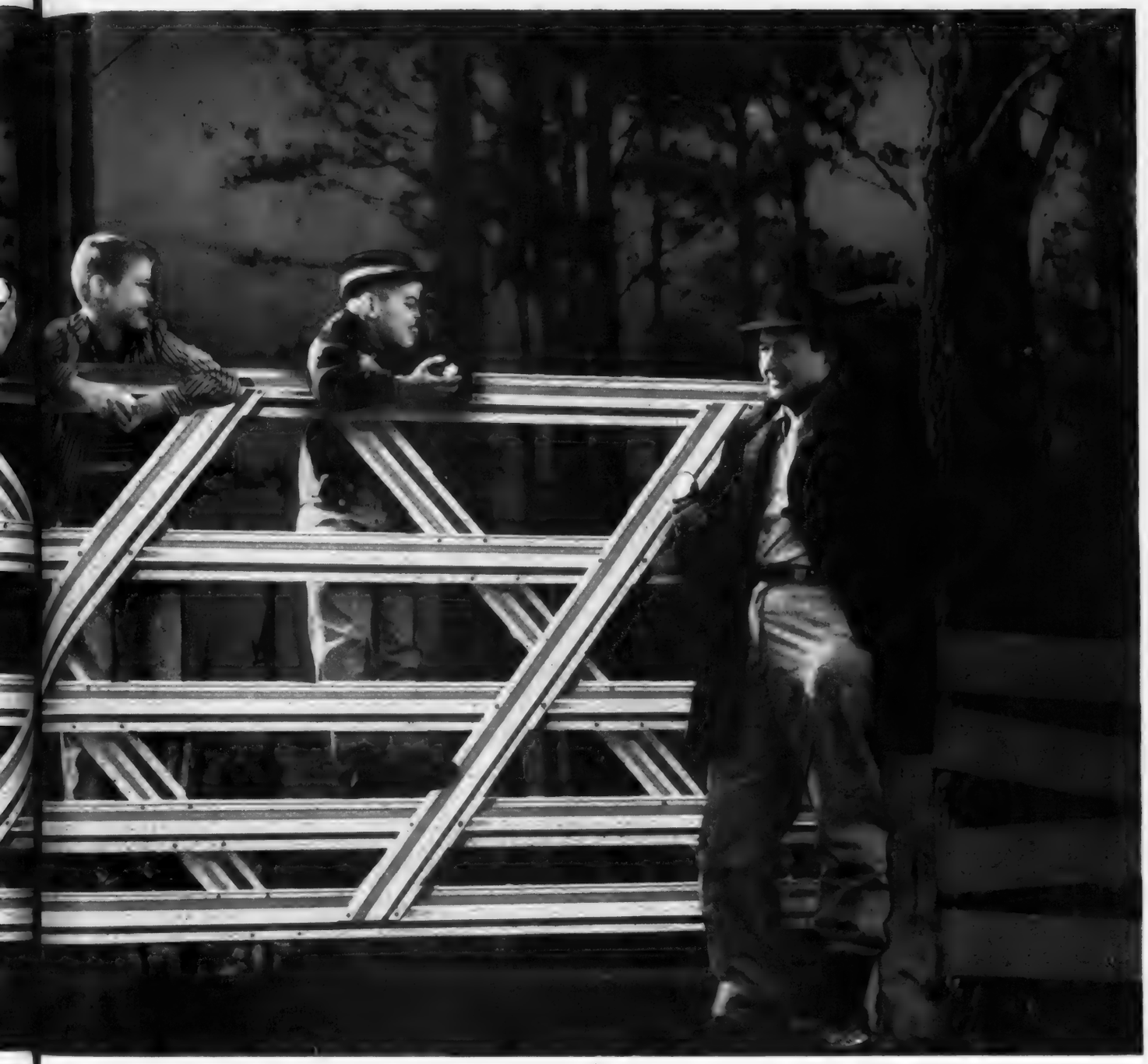

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Package includes Mixer, Grinder, Blower and Air Separator, plus large Grain Hopper.

Options include:
- Scale equipment
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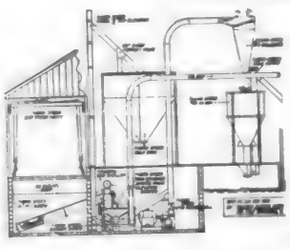

PRODUCTION feed-system by Thoro-Speed. Developed and "packaged" for requirements larger than the "Custom" line, fitted to existing barn spaces, or sold with the pre-fab house complete.

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Sutter says most people never lose respect for blasting powder even after they have learned to handle it. The blasting cap is a real danger. "Caps should be kept at least a hundred yards away from stored powder until ready to put the two together for blasting. Most states have laws to prohibit carrying or keeping caps and dynamite together.

"A farmer doesn't need to hire a powder specialist to blast stumps," Sutter suggests. "All he has to do is get an instruction booklet published by the Institute of Explosives from his powder dealer, follow the rules, and he will have no trouble.

"One other thing," he cautioned. "Stay away from any blast until the smoke clears away. This burnt nitroglycerin gas when inhaled dilates the blood vessels in the body. Since they can't dilate in the brain because of the skull, a lung full of gas will give you a terrific headache."

### Assembly Line Stump Shooting

Fred Sutter jolted out 125 stumps per day for 10 days for the Colonel last year, using a four man crew. They teamed up to probe, prime, clean out, load and wire the stumps for multiple blasting. After 20 to 30 stumps were ready the crew was cleared out. All the stumps were blasted at once.

The detonator Sutter uses is an electric device called a Permissible Multiple Shot Blasting Unit. It works from a special magneto. A safety feature is a detachable handle. The unit cannot be used without it.


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After the holes are dug the powder is tamped into the holes with a wooden pole or shovel handle. "Never use an iron crowbar or anything that can make a spark when tamping powder," Sutter warned. "I also use special non-sparking aluminum pliers with a pick and screw driver attached. These attachments are handy to cut the fuse, push a hole in the end of the stick of powder, crimp the cap on a piece of fuse, or pry open the powder box lid."

Powder companies make all types and strengths of nitroglycerin gel powder. The type most recommended for farmers is called Stumping Number 1. It is a 20 per cent gel, comes in 50 pound boxes of 120 sticks, at around $11 per box.

Electric six-second delay blasting caps used with the multiple shot blasting unit are recommended, but farmers can use regular fuse, which burns one minute per foot and can be cut as long as necessary to walk out of danger. "If it's a big shot better move at least 200 feet away," said Sutter.

### Burning the Stumps

"It's fun to burn," said the Colonel. "I love to push the stumps, logs and snags into piles and see them go up in smoke. The smog control people in California wouldn't like me very well because I've been burning piles of wood, both green and dry, for 18 years. But so has everyone else in the northwest who does any land clearing. I haven't heard of any other satisfactory way to dispose of hundreds of tons per acre of green and rotting wood. If they ever stop us we're licked. Maybe that's why I've been hurrying the clearing program," said the Colonel with a sly look. "I want a cattle ranch cleared and in top production of grass and cattle before I die and I'm only half done."

Colonel Hooker has used anything that will make a hot quick flame to help consume the tremendous piles of the stubborn by-products of the logging industry. In 1946 he was told the Army would give him a carload of incendiary bomb material if he would pay the freight on it. Hooker agreed. It cost $600.

"But it was cheap at that," said the Colonel. "It helped burn a lot of stumps." He has bought carloads of old tires, which make a very hot fire. He has also used crank case oil, stove oil, diesel fuel, paper and a combination of magnesium powder and carbide, in his quest for a hot flame to consume wood.

"But of all things tried, a fan is the best tool to increase and keep constant the intensity of the fire," the Colonel said. "My foreman, Frank Bonagofsky, got the idea by using the hay chopper blower on our old John Deere forage harvester. He'd back it up to a pile, start the fire—and say, would it take off! We've found the hay chopper too inconvenient to get in many spots so we looked around and now use a portable Garrett Cyclone Fan powered with a quarter horse gasoline engine. We've found this small fan can be placed in the right spot and will burn a pile ten times as fast as an unassisted fire, with or without incendiary material."

Some stumps bulldozed out of the ground are difficult to burn because of the soil clinging to them. After a bit of experimenting they found if they built an "A" frame, then hooked a stump on a cable and pulled it over the "A" frame and let it fall, it would shake off most of the dirt.

When the farm work is slack and the entire crew of 6 to 8 men turn out, they can pile and burn the offal from an acre in one day.

Fred Sutter volunteered another burning trick he uses on contract jobs. He takes along an air compressor, runs iron pipe into the pile of brush 20 to 30 feet in two or three spots. This pipe has holes a foot apart and alternating around the pipe. He connects the compressor hose to the pipes and after starting the fire with rags or paper soaked in oil and placed in an old tire tucked in the pile, he turns on the air. "This puts a breeze right in the middle of the pile and it really goes," Fred said. "The only trouble is that the iron pipe soon burns out. It also may be too expensive for most farmers to buy a compressor, but it is good for a contractor."

### Cleaning Up

Burning the huge piles of wood is only half the job. After that comes the tedious task of picking up the chips, small roots, and partly burned wood. The Colonel said, "Bet I've picked up ten thousand tons of chips. I've got so conscious of wanting things

# DASHING '59 DODGE

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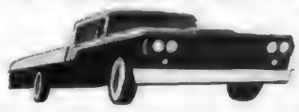
*And this Dodge SWEPTLINE'S bright new beauty has its practical side. That smart, smooth sweep from headlight to taillight makes possible more load space—the most in the low-price field!*



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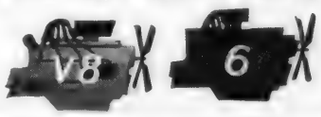


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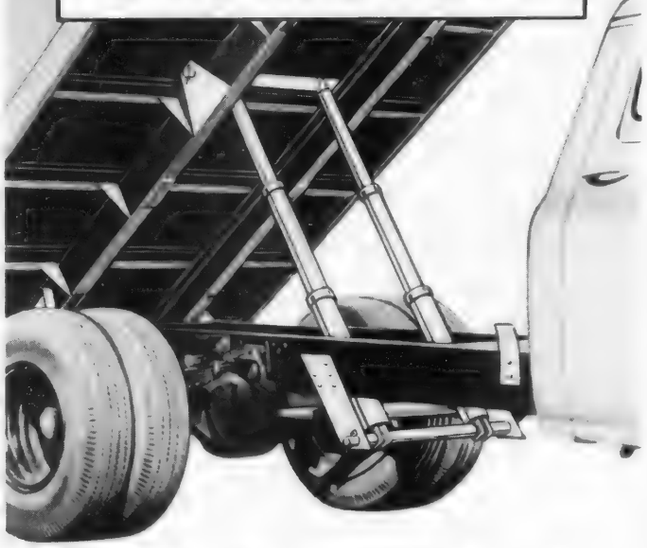

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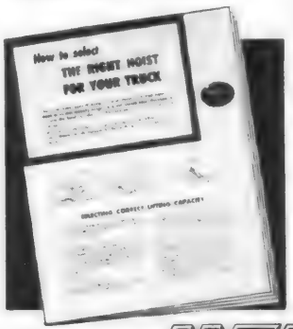


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picked up I catch myself picking up paper on Tacoma streets.

"We pile all this small stuff and burn it on the spot or throw it on a truck and haul it to one spot and burn it all together. Then we start leveling. We use the bulldozer blade to fill up the big holes and smooth out the bumps. And it's pick up, pick up, as wood works to the surface. The land is then plowed with a four bottom moldboard plow and we pick up more bits of wood, before it's gone over with an off-set disk. We may go over the area both before and after plowing with an Eversman land leveler, which smooths up the surface well enough for sprinkler irrigation and harvesting purposes. After that first going over we're in the grass and clover business.

"It's about as costly to burn as it is to blast those stumps," the Colonel retorted when asked if the burning operation wasn't a reasonable priced activity. "On one 100 acre field, burning cost $150 per acre. This included labor, bulldozer, truck, fuel and other equipment."

### Blasting and Clearing Costs

"Blasting costs run around $4 to $5 per average stump; big ones go up to $10," the Colonel said. "With 50 stumps per acre there goes $250. Bulldozing the stumps into piles will cost from $50 to $200 per acre, depending on the number of stumps, down timber and second growth.

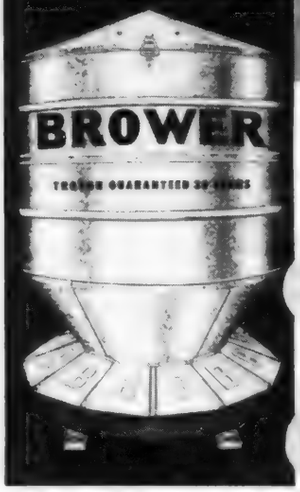
"I haven't figured picking up chips except as a percentage of wages paid. I'd say it would run $50 per acre because you have to pick three or four times.

"The total costs of clearing the 400 acres have run from $200 to $1,000 an acre, at least an average of $500 per acre," said the Colonel, summing up. "The cost has been high—but time will repay as the need for this land increases its value. I've made the land blossom and changed its appearance from one of ugliness to a peaceful pastoral landscape. And I've enjoyed every minute of it. Some people spend their money at the races. I spend mine clearing land and developing a cattle ranch."

(*Continued on page* 91)


THE BIG CAPACITIES YOU WANT!
THE RUGGED CONSTRUCTION YOU NEED!

BROWER'S NEW ROUND HOG FEEDER

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Fill only once or twice a week — saves you time and work.

30 YEARS TROUGH GUARANTEE
Cast iron trough guaranteed 30 years. Also available with heavy gauge steel trough, guaranteed 15 years.

**BUILT TO OUTLAST...OUTPERFORM THEM ALL**

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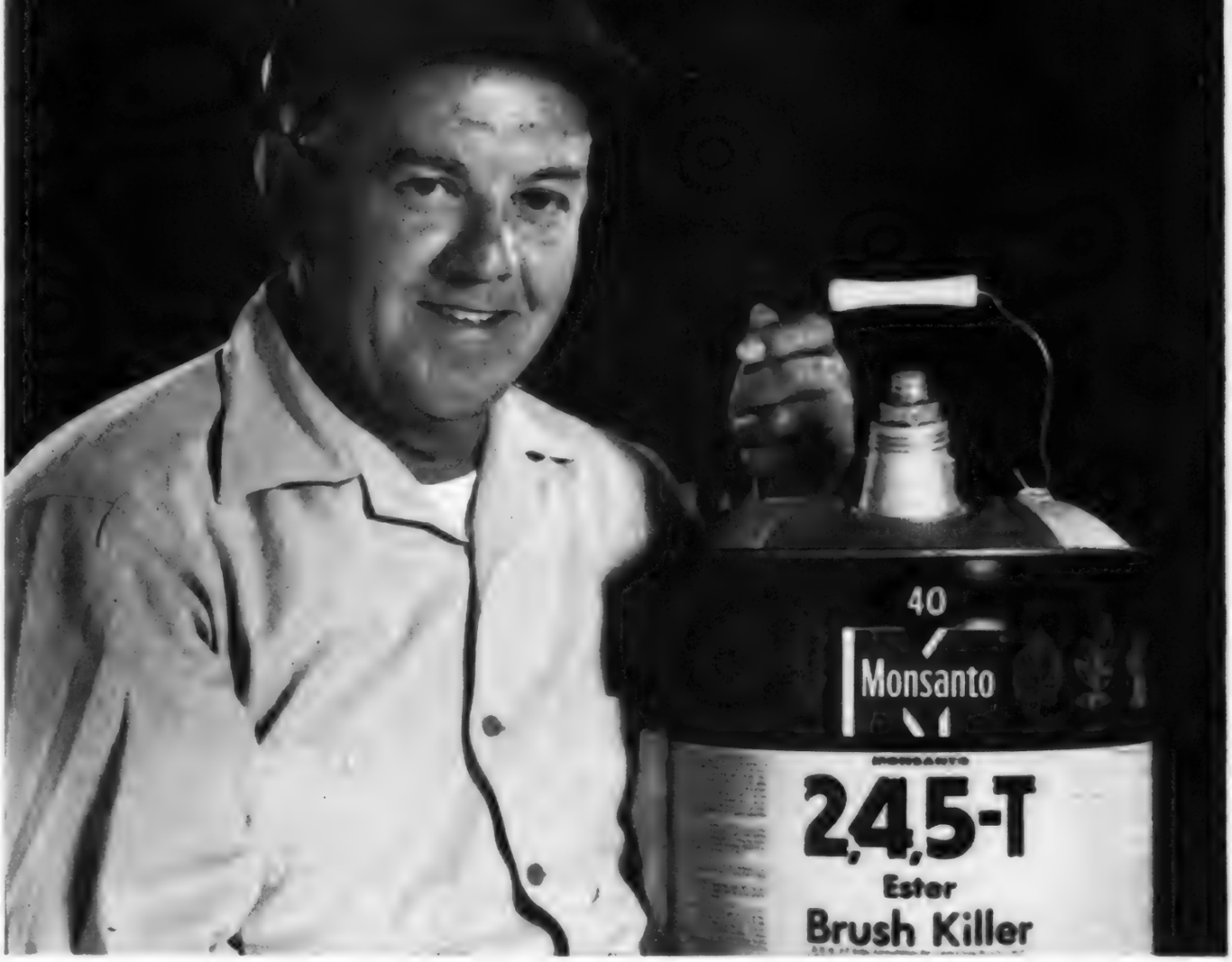
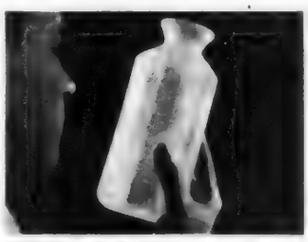
## MONSANTO'S "RED" EMM SAYS:

# You can't beat this brush spray for best kill on every job




Nothing you ever saw cleans up brush like Monsanto's powerful brush killers. And now you can get Monsanto's six different brush sprays in this handy, easy-flow spout-top can. Each is full strength and, chemically, the best you can buy. They mix fast in water or oil, spray clean and won't clog nozzles. It pays to buy Monsanto-brand quality. Only a few pennies' worth of these brush killers goes a long way in your fields... ask your Monsanto Dealer.



FREE! *Spray-Saver* helps you measure exact amount of spray for each brush job. See it at your dealer's. It's mighty handy!

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MONSANTO CHEMICAL COMPANY, Organic Chemicals Division
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Send today for FREE copy of "'Red' Emm's Weed and Brush Killing Guide." Tells how you can get cleaner fields with Monsanto farm chemicals: Randox®... 2,4-D and MCP weed killers... Vegadex®... Brush killers.

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*Address*.....

*City or County*..... *State*.....

Here we see Mr. Bauer pouring milk into his Dari-Kool. Note that the height of his cooler is just right for easy milk pouring.

The Bauer's like the easy-cleaning feature of their Dari-Kool. They report they have had no trouble at all with milkstone.

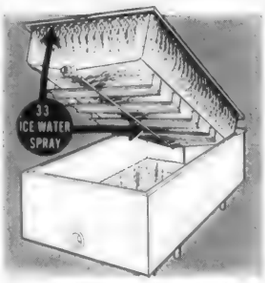
# "Our DARI-KOOL Has The Milk Down to 38° In Just No Time!"

Writes MR. RUDOLPH BAUER, R1, Brownsville, Wis.

"We are very much pleased with our Dari-Kool because it is so easy to clean. Being an ice-bank cooler the inside of the milk tank is always moist, so spattered milk cannot dry on and set. We have had no trouble at all with milkstone. We feel that a Dari-Kool cools milk faster than any other cooler. Our milk is down to 38° in just no time. When we pour the warm morning milk in with the cold evening's milk the blend temperature never goes over 45°. We recommend Dari-Kool to all dairymen!"

(Signed) *Rudolph Bauer*

## NEW DARI-KOOLS COOL MILK FASTER THAN ANY OTHER COOLER — *and here's the reason why!*




33° ice-water is pressure sprayed over all 4 sides and the entire bottom of the milk tank. Milk heat is removed faster than is possible with any other cooler or method. The milk cannot be damaged by freezing. Dari-Kool's faster cooling assures lowest blend temperatures — higher quality milk.

*A recent nation-wide bulk tank survey conducted by a leading farm magazine shows that Dari-Kool not only leads in sales but is preferred 3 to 1 over the next leading brand. Your Dari-Kool dealer has a copy of this survey. Ask to see it.*

## The Largest-Selling Cooler In The World!

Shown above, new low-design 400 gallon Dari-Kool. Also available in capacities from 100 to 1250 gallons.

MEETS ALL 3A STANDARDS

**DARI-KOOL**
**BULK MILK COOLER**

*Write Dept. 66 today for your*
**FREE Milkhouse Plan Kit**
**DAIRY EQUIPMENT COMPANY**
MADISON, WISCONSIN
*Manufacturers of KARI-KOOL Tsuck Tanks*

Today Colonel Hooker carries over 350 head of Herefords on these cleared and reseeded acres.

Getting a piece of cleared land into crop production the first year out of stumps is also expensive. Nat Woodhouse, Thurston County Agent, figured the Colonel's costs for seedbed preparation, fertilizer, seed and planting, at around $30 per acre. "This is about $10 higher than the county average, but no one works the ground as well as does the Colonel." The Colonel plants a recommended mixture of orchard grass, New Zealand white clover, and alfalfa at a rate of 15 pounds per acre.

"We get 45 inches of rainfall insuring good germination if planted in fall or early spring and it's irrigated every ten days during the summer," the Colonel said.

"If you can get the land into good pasture you can get back the cost of $500 for clearing in a few years. I've done it in three years on some of our good land that has produced two purebred calves that sold for $600 each at weaning time. I can justify crediting at least one-fourth of this income to clearing and seeding costs.

"Washington State College agronomists told me I would need plenty of nitrogen to aid in decomposing all the vegetative matter in the soil. We tried several fertilizers. My best response has been with anhydrous ammonia. I tried it at several levels, but have settled at 160 to 200 pounds per acre."

Anhydrous ammonia is a liquid which becomes gaseous on application. The Colonel applies it with a special machine with a pressure supply tank and spreader equipment. The gas is funneled from 4 to 6 inches deep into the soil through a row of forward earth-slicing teeth. This method allows very little to escape. In carload lots it costs the Colonel only 4½ cents per pound delivered. "The total is around $12 per acre at a rate of 200 pounds per acre," the Colonel said.

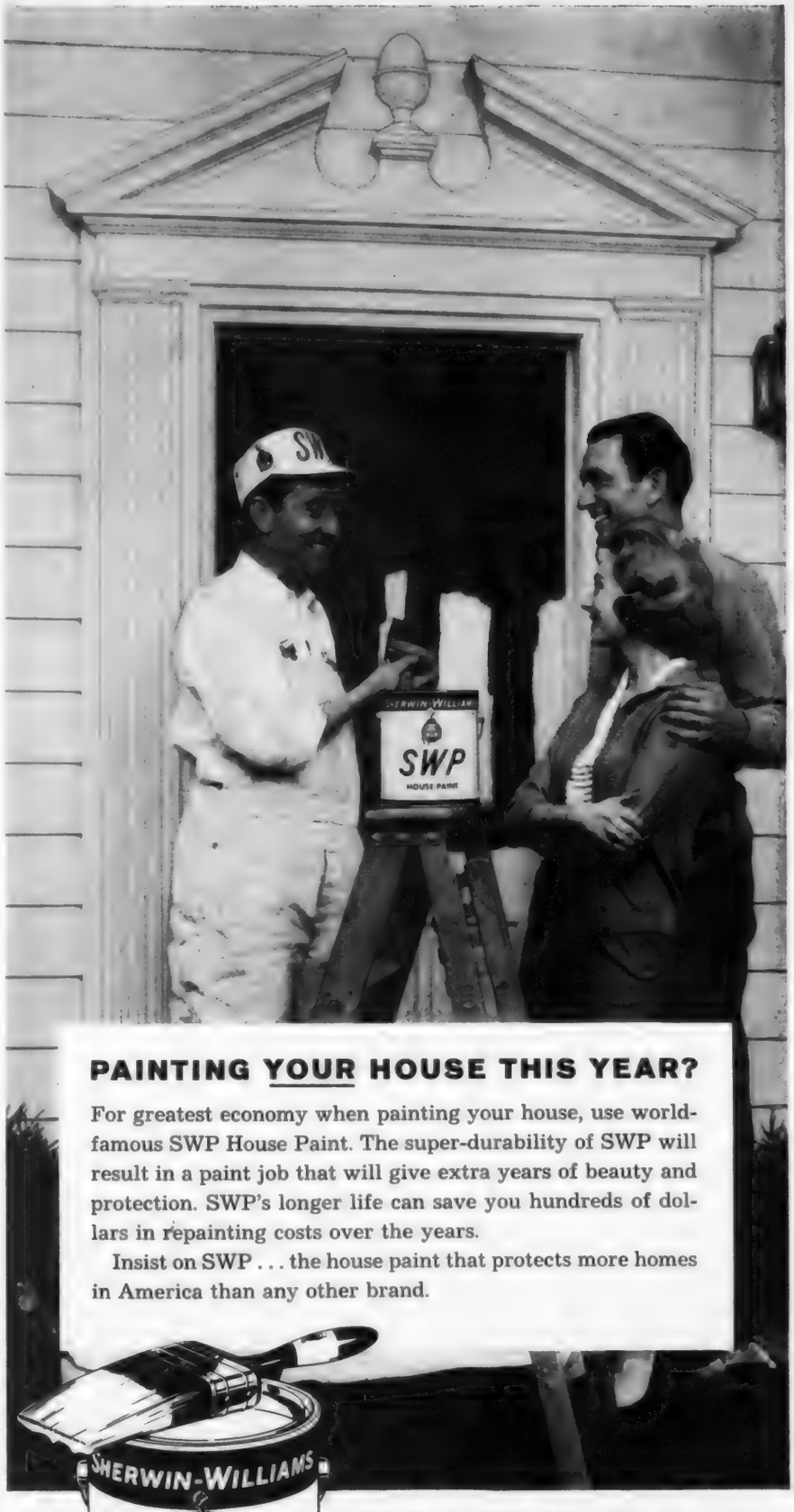
### The Natural Crop

With the better land in pasture and silage crops, the Colonel turned to the tried and proven crop for his Class VI land—trees. Douglas-fir seedlings are planted at the rate of 900 per acre, but only after the land has been cleared of stumps.

Foreman Bonagofsky can't figure why the Colonel wants to put cleared land back into trees. "We're running a cattle ranch, not a farm forest," Frank said disdainfully, "and here the Colonel is taking 20 acres I had all ready for grass."

In defense of his newest project, Colonel Hooker pointed to a six foot stump. "That tree probably cut out 10,000 board feet of lumber worth only $20 per thousand back in 1875. Today, that same lumber would be worth $95 per thousand or $7500 more per acre. What will these new seedlings be worth 80 years from now? If lumber keeps going up the sky's the limit and my great-great-grand kids will benefit."

THE AUTHOR: Joseph Muir is a farm advisor in Contra Costa County, California. He has studied and worked in Utah, Texas, Washington, and California.

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WITH A RELIABLE
JOHNSTON PUMP
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Johnstons give you more water, too – up to 34% in many cases – plus the kind of trouble-free operation that only comes from a deep well pump built by a company that has specialized in their design and manufacture for almost 50 years.
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Indio, Coachella Valley Pump & Supply
Lancaster, Fred Miller
Leuzinger, Goehring Hardware & Supplies
Lompoc, Alexander Bros.
Madera, J. L. Williams
Newbury Park, Hoff Pump Service
North Sacramento, Odell's Pump Service
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Ontario, Neil A. McMullin
Palm City, Union Pump & Equipment Co.
Palo Alto, Robert Garcia Well Drilling
Porterville, D. S. Jackson Pump Service
Ramona, Ray West
Santa Ana, McCalla Bros. Pump & Drilling Co.
Santa Rosa, Bartley Pump Co.
Victorville, Water Service & Equipment Co.
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Jesup, Harris Gin Co.
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Shreveport, Fearless Supply Co.
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Scottville, Pump Engineering & Supply
MINNESOTA
Minneapolis, Tanks Equipment Co.
MISSOURI
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Billings, Midland Implement Co.
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Las Cruces, Jos L. Smith Implement Co.
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Fillmore, Dallas Equipment Co.
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VIRGINIA
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Yakima, DeCoto Bros. Irrigation Div.
WEST VIRGINIA
Charleston, Virginia Electric

## WHEN DO PLANTS NEED WATER?

(*Continued from page* 66)

Under our conditions, our crops need at least one inch of water per week and perhaps a little more during drouth periods."

Corn, according to the staff at Clemson Agricultural College, can stand considerable drouth before tasseling time, but should be irrigated from tasseling through the roasting ear stage, provided sufficient moisture is available to support growth during the season before tasseling. The best indication is to irrigate when the corn wilts by 10 a.m. Hal B. Clark of the irrigation engineering firm of A. E. Robinson of Kansas City, Missouri, suggests considerably heavier irrigation for the western part of the country. He recommends a preplanting irrigation of about eight inches which can be put on in the fall or in the spring of the year, and the application of about three inches of water when the corn is 36 inches high, again at the early tassel stage, at silking stage, and at milk stage.

The University of California has laid down certain drouth symptoms in cotton to help guide the farmer in his irrigation. "After flowering begins," the scientists at California say, "the plant should grow steadily but not luxuriantly. The squares at the top of the plant should be rather prominent. A few flowers should be readily observed among the top leaves. When only the leaves are noticeable, too rapid a growth is being made. A flower garden effect indicates restricted growth and a need of irrigation already too long delayed. Ordinarily there should be three or four inches of tender, green stem between the terminal bud and the reddish coloring of the stalk. An extension of this reddish coloring toward the terminal bud indicates a checking of growth and the need of irrigation.

"Careful observation will show a change in appearance of the plant before signs of wilting occur. Foliage of the plant will have a slightly bluish tinge and, in dryer spots, it appears somewhat darker."

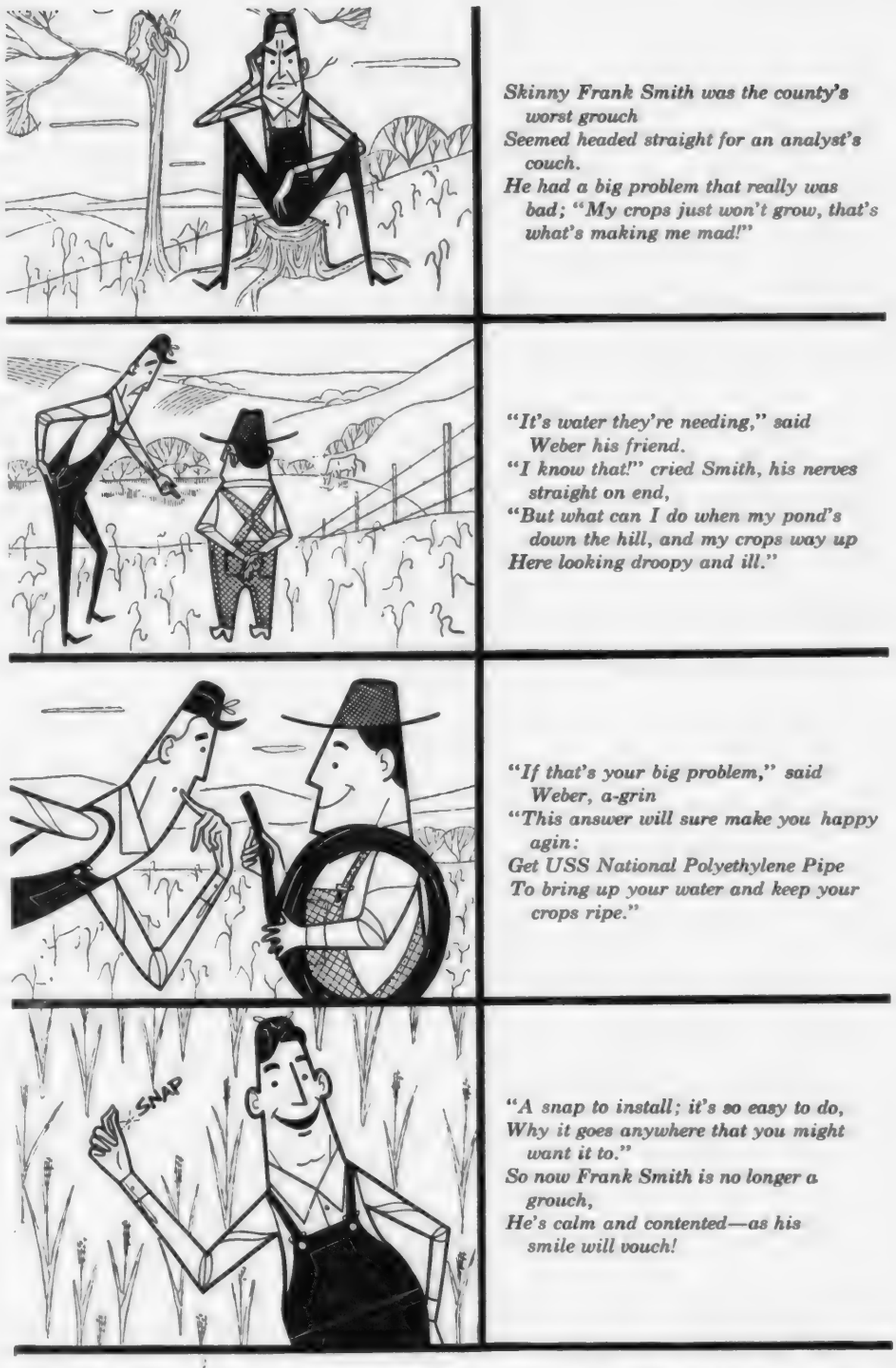
In the southeast, it has been found that the best water efficiency is obtained on cotton if the crop is irrigated during the fruiting stage from blooming until bolls are mature. Experiments at Clemson Agricultural College have shown that for peaches, water should be provided if needed during pit hardening and during the two weeks prior to ripening to get a maximum crop.

The great danger of using the plant condition as a guide is that the plants will have suffered by the time the farmer gets around to supplying them with water. For this reason a large number of agronomists and agricultural engineers place heavy emphasis on judging the moisture in the soil.

### To Sum It All Up

Some crops can stand considerable drouth at some periods without hurting the final yields if they get water when they need it most. We need to know this for all crops for most efficient use of water.

In our rather limited experience with


*Skinny Frank Smith was the county's worst grouch*
*Seemed headed straight for an analyst's couch.*
*He had a big problem that really was bad; "My crops just won't grow, that's what's making me mad!"*

*"It's water they're needing," said Weber his friend.*
*"I know that!" cried Smith, his nerves straight on end,*
*"But what can I do when my pond's down the hill, and my crops way up*
*Here looking droopy and ill."*

*"If that's your big problem," said Weber, a-grin*
*"This answer will sure make you happy agin:*
*Get USS National Polyethylene Pipe*
*To bring up your water and keep your crops ripe."*

*"A snap to install; it's so easy to do,*
*Why it goes anywhere that you might want it to."*
*So now Frank Smith is no longer a grouch,*
*He's calm and contented—as his smile will vouch!*

**Remember,** USS National Polyethylene Pipe unrolls like a hose, resists acids, alkalies and rot, performs efficiently in a temperature range of −90°F. to +120°F., and won't crack or break in sub-zero weather.

**National Polyethylene Pipe** comes in lengths up to 400 feet, in diameters from ½" to 6". And, it's make of 100% virgin polyethylene plastic to which 3% carbon black filler has been added to prevent deterioration from ultra-violet rays. Insert fittings in nylon and styrene copolymers (NSF) are now available from National Tube. For complete information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa., or see your nearest National Polyethylene Pipe Distributor.

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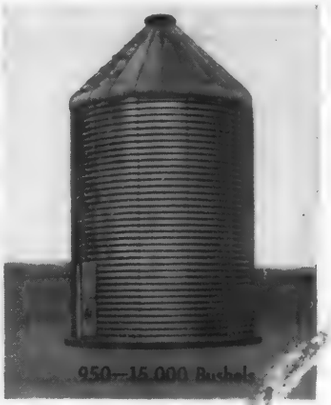
First Time Available . . .

# Just ONE STOP for all Your Crop Conditioning and Storage Needs




**It's news!** Now you can turn all your grain conditioning and storage problems over to *one* man . . . your Behlen dealer. He has Behlen's Common Sense answer. Advance engineered to the minute!

## New Behlen Grain Tank

- **Exclusive New "Eave-Seal"**—Another pioneering first! Now same rugged strength of sidewall extended from ground to roof peak. Behlen Commonsense design curves roof into wall panels for air-tight "Eave-Seal." Heavy ⅜" bolts with special nylon washers every 3-in. stops all chance of rain leakage.
- **Strong, And How!**—Only Behlen uses *vertical* heavy duty 16 and 18-gauge steel sidewall panels with deep corrugation. Result, they are as wind-and-wear proof at the top as at the bottom.
- **Eliminates Hand Scooping**—Behlen's exclusive "Steep Pitch" roof design lets you fill your Tank to the peak without hand-leveling.
- **Weather-Tight**—Non-aging Butyl stripping seals weather, insects, rodents out.
- **Designed for Money-Saving Floor**—New! Special groove die-formed in base of sidewall to receive economical metal floor. Allows erection of Tanks on inexpensive foundation materials like concrete block or wooden plank.
- **Special Drying Floors**—Optional drying floor systems available . . . completely engineered from recommendations of the USDA and leading Ag. Colleges.

## New Behlen Curvet with MORE Vertical Side Wall for Combined Grain-Machinery Storage

*If you anticipate a 2-year crop of 8,000 bu. or more, this is for you:*

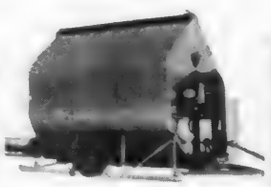
- **Almost Straight Side Wall Capacity**—Behlen's exclusive *full-arc* construction gives you almost as much vertical storage space near the walls as you get in a regular steel building. Proof: 16-ft. combine and 2-row picker, with truck in between, can be stored across width of Curvet. And at 30% under cost of straight side walls!

- **Stores Grain, Machinery**—Take advantage of on-the-farm grain storage program and get your machinery and tools housed. It's worth 5-10% of your equipment investment! Special partition bulkhead separates grain and machinery.
- **Heavy Gauge Panels Keep Out Weather**—*All* the strength of Behlen Curvet is where you want it . . . between you and the elements. No costly, heavy framework! Channel ridge steel panels hold grain 12-ft. high against the side walls of 18-ft. ceiling Curvet. Absolutely hail-proof!
- **Less Seam! No Nails, Clips, Goop!**—Curvet licks the leakage problem. Less seam space. When properly erected, the Butyl sealed seams are 99% airtight. Compare this with metal-against-metal caulked seams of other buildings. Also Behlen uses heavier bolts, more of them . . . ⅜-in. bolt, galvanized, one every 6-in. Compare this bolt-spacing with other buildings. Stops shear! Stops tear! No place for leakage to start.
- **Conditioning Systems**—High-capacity aeration fans and drying floors are optional.

### What About Cost?

Government ASC payments can pay for the Curvet in 28 months or less . . . increasing the value of your farm by $8,000 to $10,000 at no cost to you.

## Grain Dryer



- **Fast Drying** — The portable Behlen removes 623 gals. of water from a 500-bu. batch of 30% corn in 2½ hours.
- **Lasts Up To 10 Times Longer**—By moving the air instead of the grain, your Behlen grain-moving machinery is in use only 1/10th the time.
- **4 Big Sizes**—250, 375, 500, and 750-bu. capacities. Operate off PTO or electric motor . . . burn propane or natural gas.

## Corn Cribs

- **"Steep Pitch" Roof** — Design follows the natural ^ of free-flowing corn . . . fills to the peak without hand scooping.
- **Easy Unloading**—Extra-wide doors permit corn removal by your tractor's front end loader.
- **"Extra" Zinc**—No. 2 gauge steel Bar Mesh is galvanized *after welding* with up to 6 times more zinc coating.
- **All Sizes**—From 611 to 1940-bu. cap.

Also Heat Blowers, Aeration Fans, and Ventilators and Tunnels. Write for dealer's name and full information.

Behlen Manufacturing Company
Dept. F-6 Columbus, Nebr.

PURCHASE Plan

supplemental irrigation in the rainfall belt, here are a few leads as to when to irrigate some principal crops other than at planting time, when they all need it if moisture is not already in the soil:

Corn can stand considerable drouth early. But give it water just before, during, and a while after tasseling time and you have it made.

Cotton, too, can stand some early drouth without hurt. Then give it water from the first bloom to the first open boll.

Tobacco can stand drouth early but needs water when it makes its "big stretch" a few weeks before ripening.

Truck crops generally need adequate water most when their fruiting or edible parts are forming and up to harvest.

Peaches have two critical periods, first is when the pit is hardening, and then when they are making their "big swell" before ripening.

The old feeding proverb, "The master's eye fatteneth his cattle," can be applied to supplemental irrigation, too.

THE AUTHOR: Jim Eleazer is a frequent contributor to *The Farm Quarterly*. He is Information Specialist at Clemson College, S. C., and author of "A Dutch Fork Farm Boy."

## SOLID IRRIGATION

(*Continued from page* 48)

solid system is, of course, somewhat more difficult than with a movable pipe arrangement. On the Mettler Farms the labor costs of installing and removing pipe are $7.50 an acre; on other farms with less experience the cost runs as high as $10.

Labor costs of operation, however, are very low. With a solid system one man can irrigate from 80 to 160 acres as compared to 40 with a movable pipe system.

The cost of the system will vary with pipe size and design. Some small pipe systems cost as little as $400 an acre. A more common cost figure is the $600 to $800 per acre paid by the Mettler Farms. In justifying such costs, Orvin Mettler said, "We figure it costs $50 an acre to irrigate with movable pipe. With a cost of $7.50 for laying down a solid system and one man irrigating 160 acres, a substantial amount is saved to pay off such a system."

Not everyone who has tried this system endorses it. John A. Bidart, a neighbor of Mettler's, tried solid irrigation on a section of potatoes a year ago. He concluded that on his land the initial expense was not justified. He said, "It cost us $700 an acre to install this system as compared to around $100 an acre for movable pipe. Our cost for putting the system on the land and taking it off each year totaled $10 per acre and our saving in labor amounted to around half. In other words, a man who normally would be able to take care of 40 acres was able to handle 80 with the solid system. We hoped that keeping the men out of the field would increase yield and quality. In our case, at least, this didn't happen.

"Our potato land is a nice, sandy soil

**New UDT-817** International Turbotorque® diesel, rated at 385 max. hp and 300 cont. hp @ 2100 rpm, now heads the 24-model heavy-duty International pump power line.

**Big International V-8 NATURAL GAS** Model UV-549 operates 24 hours daily driving a Peerless 8-in. pump that produces 1,160 gpm with 320-ft. pump setting.

# New UDT-817 Diesel extends range of 24-model International® line to 385 hp

Addition of the new direct-start 6-cylinder UDT-817 Turbotorque diesel irrigation engine to the International line now gives you 24 choices of dependable pump power ranging upward to 385 max. horsepower.

These are just a few of the features that make the new UDT-817 such a sound selection for deep well pumping: 300 continuous hp @ 2100 rpm; direct injection with exclusive IH twin plunger metering and distribution pump for outstanding diesel fuel economy; Turbocharger to harness the waste energy in exhaust gases for high power output; twin valve free-breathing. efficiency; replaceable wet cylinder sleeves with velocity swirl-flow cooling for uniform operating temperature; big, 7-bearing counterbalanced crankshaft; and many other modern design features for long-life, low-cost operation.

But you do not have to be a big power user to benefit from low-cost International engine performance—not with 23 other models to choose from. And that's mighty important when you consider that you alone fix the rates on irrigation water when you select engines for your pumps. By choosing dependable International power, you get most favorable water rates with these savings: 1) pump-matched power—no underpowering or overpowering—with 24 well-spaced models; 2) lower fuel costs with factory-engineered equipment to burn your least costly available fuel; and 3) lower maintenance costs with heavy-duty International engines that have always cost less to own and operate.

The nine new International irrigation engines now in the line and identified by piston displacement include: new naturally aspirated or turbocharged "817" diesels; two new smaller direct-start, 6-cylinder diesels—the UD-282, and UD-236; the 6-cylinder UD-554 and the 4-cylinder UD-370 diesels; and new carbureted engines—the 4-cylinder UC-135 and brand new UC-263 and UC-221 6-cylinder models.

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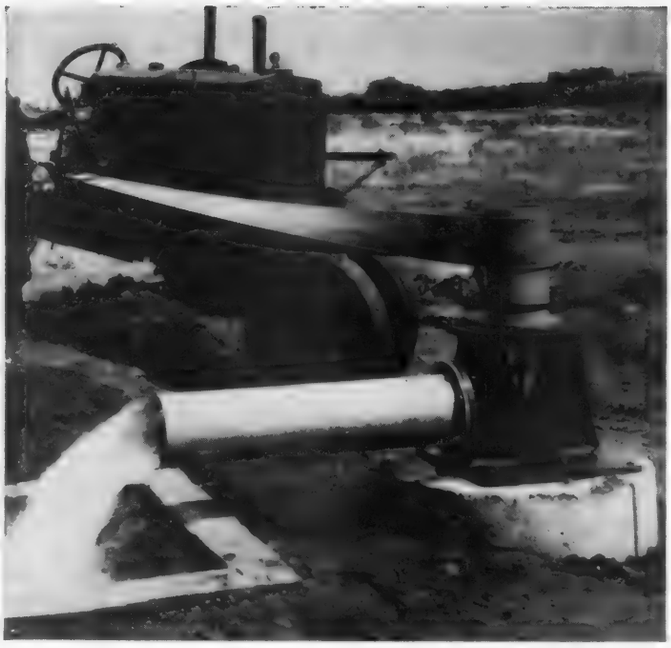

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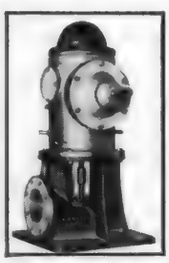

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which is ideal for sprinkler irrigation, but it has its problems. One of them is blowing. The solid system putting down a light sprinkling of water very rapidly over the whole field to hold the soil in place did a good job in this respect.

"I should think the solid system would be much more useful on heavier soils where a man must wait twelve or more hours after sprinkling to get onto the land to move pipe. With our light sandy soils, however," Bidart continued, "we can get onto the field immediately after sprinkling."

With the development of a solid system has come automation. Complete automation was shown to be possible several years ago by Dr. George Boyucous of Michigan State University, who developed a system which could be controlled by the moisture in the soils. Now the John Bean Division of the Food Machinery and Chemical Corporation has come up with a new concept of automation.

They pump water down all lateral lines of a solid system at the same time. By using a sequence valve at each sprinkler, they are able, however, to sprinkle from only one sprinkler on each lateral line. Thus, instead of sprinkling from 50 or 100 sprinklers on several laterals, they will sprinkle from one sprinkler on each lateral down the entire length of the field.

The heart of this system is the sequence valve. One of these clever devices is located at the base of each sprinkler riser. The valve has three positions, one for sprinkling which closes off the line beyond the sprinkler, one for by-pass which shuts off the sprinkler and allows the water to go on to the next sprinkler head, and one reset position which begins the whole cycle again. The valve is shifted from one position to the next by a sudden pressure change which is accomplished by momentarily interrupting the pumping. This is done by a timing device. The sudden surges of water advance the sprinkling down the field.

Farmers interested in solid irrigation are watching this development. John Bidart's comment is typical. "I think it will be a little more economical to set in and it'll be completely automatic. It will certainly save labor. It looks very promising."

Though a solid system offers little promise in the East, where a farmer may average two or three irrigations a year to get maximum production from a crop, in the West, where farmers are totally dependent upon irrigation, it has possibilities. In areas where the climate and soil permits two crops a year, where the crops are of high value, and where labor is also expensive, this system, particularly the automated variety, is proving its worth.

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### FEEDING SILAGE IN THE SUMMER

(*Continued from page* 67)

when you are harvesting your crops for silage and the machines are already in the field. The fresh forage should be fed in the same place and manner as the silage.

Limited pasture usually means a small lot for night grazing near the barn. Pasture might also be limited to less productive, rough ground, unsuited to cultivation. Earl Stoffer of Olsburg, Kansas, in the Flint Hills area, grows good corn and sorghum on his bottomland. The cattle are turned out on the hills for pasture, but they come down each day for silage. Jim McChesney of New Galilee, Pennsylvania, tapers off on silage as grass fields reach their peak in late May. By late June, silage feeding from the new crop is started as grazing slackens.

Where silage making and feeding equipment are at hand, a further step toward summer silage usually involves the expense of additional silos. In a summer silage feeding program, one container is not enough. As in winter there must be access to corn silage and to small grain or other silages so they can be fed in combination. Two silos are the minimum. Several kinds of silage may be fed out from a horizontal silo simultaneously, but unless there is a second and third silo, there is no place to put freshly ensiled crops. Where silage is fed the year around, silage making should begin with the earliest spring meadow crops and not end until the last corn is ensiled in the fall. Ideally, three silos permit

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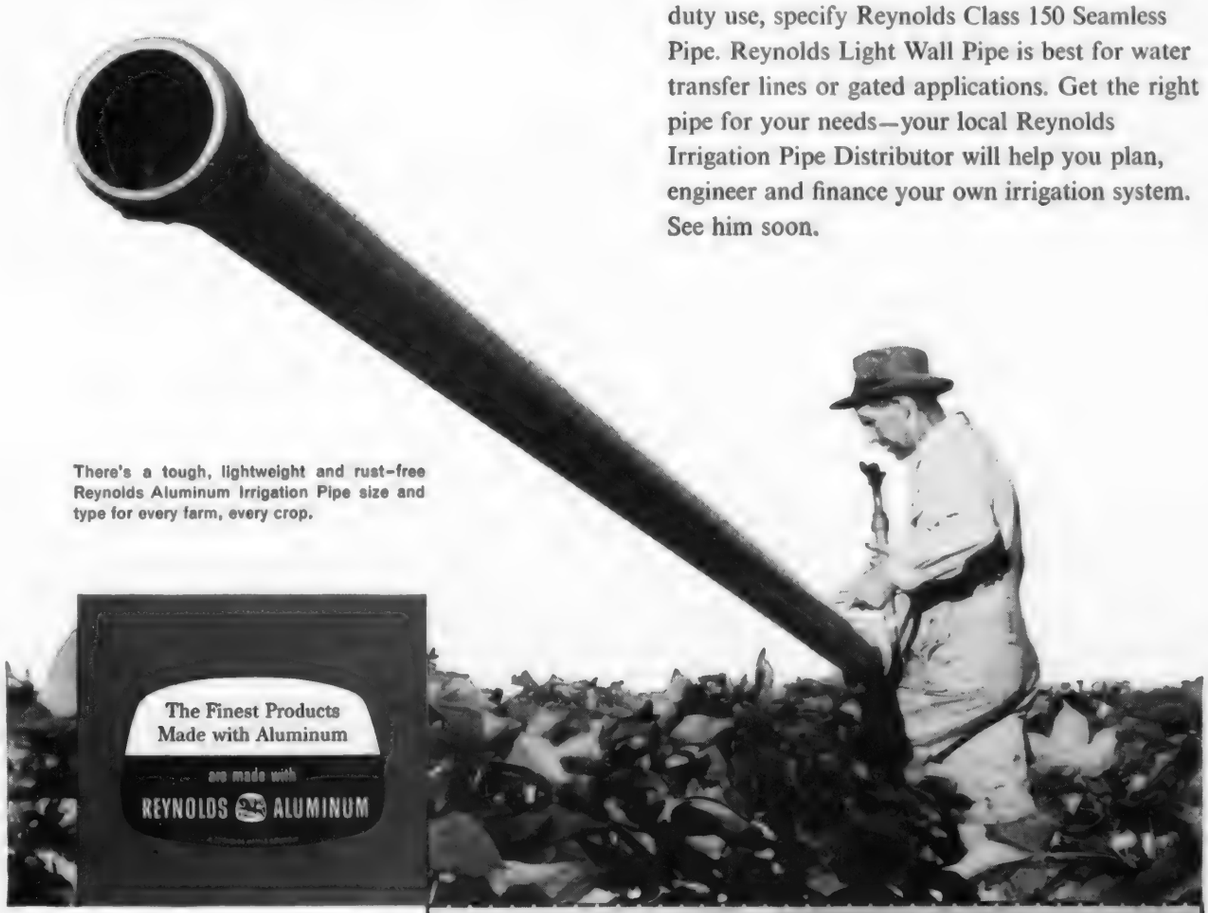

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a carry-over from the fat years to the lean ones. There is no way to hold back a pasture for very long. An unexpectedly heavy meadow crop or an excess yield of small grain will keep until the dry days come if ensiled properly.

Can quickly-erected temporary silos be used? They can, but they are seldom durable and prove most costly in the end. The reason for making silage is to preserve the maximum amount of nutrients in the best possible condition and this is easiest to accomplish in a well-designed, permanent silo. Good silage is worthy of the best container you have. I highly recommend the use of plastic silage caps. Single sheets are satisfactory for use in tower silos. Single sheet covers for horizontal silos are not usually good. Strips, not over six feet wide, should be used, laid across, and lapped. They must be stretched. Each strip can be weighted down independently of the others. As the forage shrinks and settles, by stretching the sheets individually, a farmer can keep the cover tight so that the silage is better preserved.

How do you make silages for summer use? The requirements for making good silage do not vary according to the season in which they are to be fed, but the feeding requires special care. Any silage spoils more quickly on exposure during the heat of summer. It is wise to feed the best preserved silage available.

There are a few considerations when making silages, regardless of the time of feeding. Alfalfa, oats, barley, and various grasses including Johnson and Sudan grass, are often harvested as silage in hot weather. Dryness of these crops during summer may be a problem. Cutting while the dew is on helps. Proper attention to moisture content in wilting and careful packing in the silo are necessary. It is also a good idea to start cutting such crops when they are younger than usually considered ready, so that all the crops can be harvested before they get too old.

Silage need not be aged a long time before it is fed. If silage is to be fed as soon as it is put up, I do not think a cover should be used. In that case, I would recommend that the top material be chemically treated instead. A small quantity of bisulphite, enough to treat several feet of silage at 4 pounds per ton, works well. Don't feed the silage for a day or two to give the bisulphite a chance to act. The treated portion of the silage will not be as high in quality as the rest of the silage, but the difference will not be great.

### Rumen Bacteria Digest the Feed

Digestion of forages in cattle depends on rumen bacteria. The kinds of bacteria that thrive in the rumen are determined by the kind of feed eaten. A change in ration demands a change in the kinds of bacteria needed to digest the new forage.

Walter D. Hunnicutt, a farm advisor, who for many years represented the National Dairy Products Corporation, has promoted the feeding of corn and grass silages in combination. The corn silage provides plenty of carbohydrates for the bacteria to work on, and the grass silage offers more protein. Hunnicutt has said this, "If both types of silages are fed liberally the year around, the rumen is never without the two major types of rumen bacteria able to digest most forages. The amounts of each silage must be adjusted so that both are on hand constantly. If you suddenly change a ration or a kind of silage, milk production may fall so much that cows don't recover during that lactation."

Various silages should be mixed by blending, by augering them together into a feed bunk, by slicing off the vertical sections of layered silages in a horizontal silo, or by feeding one silage in the morning and the other in the evening.

Silage is primarily suited to dairying and beef production. Cow and calf herds, and sheep do well on summer silage, but they also do well in a system in which there is little dependence on silage. Such stock can maintain a satisfactory productive rate on land suited to the extensive farming of pasture or range land.

For many large operators, summer feeding of silage is essential to high production. For them open season for silos is June to June.

THE AUTHOR: Charles F. Rogers has been in agricultural research work for 34 years. His specialty, hay and silage. He has recently shifted from experiment station work to consultation and is retained as consultant by a number of companies producing for agriculture.

## FRESH AIR INDOORS

(*Continued from page 44*)

Because there is no set way of figuring ventilation needs in uninsulated buildings, play it safe and provide plenty of ventilators and air intakes. The best place for the ventilators is on the ridge of the roof because the hot air rises to this point, and wind blowing on a building causes natural suction at the ridge. Gable ends of buildings are also good spots for ventilators. Intakes should be near the floor. Air intakes should be well distributed around the building and their total area should be twice the open area of the ridge or gable ventilators. In some buildings windows and doors plus louvers and sliding panels will provide the needed air intakes.

Ridge ventilators should be spaced no further than 30 feet from the end of a building and no further apart than 60 feet center to center along the roof as a minimum for dry occupancy conditions in narrow buildings. As moisture and building width increase, the spacing should be reduced. Continuous ridge ventilators should be used for extreme conditions, such as wide poultry houses without fans.

How many roof ventilators you will need for a livestock shelter varies with climate, weather, barn use and a few other factors. But it's a safe bet that you should provide at least one square foot of roof opening per 400 square feet of floor space where livestock are not crowded. Many livestock producers insist on a ratio of one square foot of ventilator for each 150 square feet of floor.

There are times when a building can be


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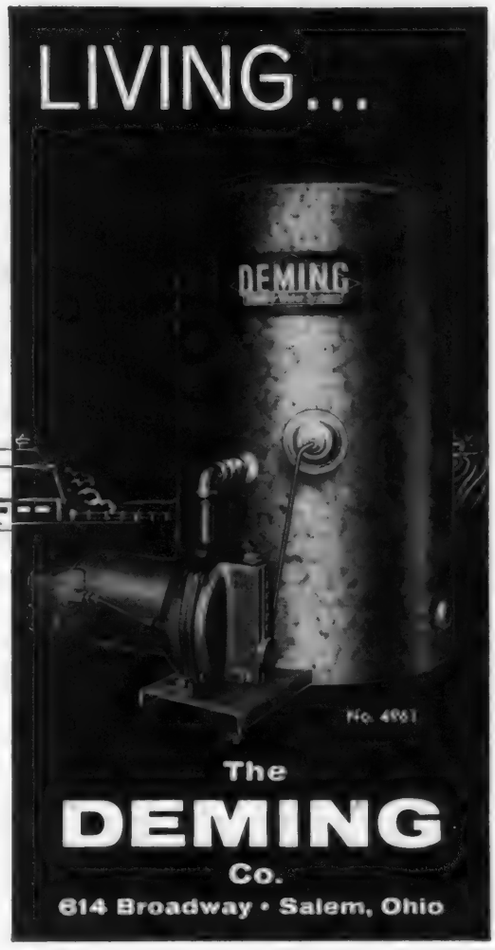


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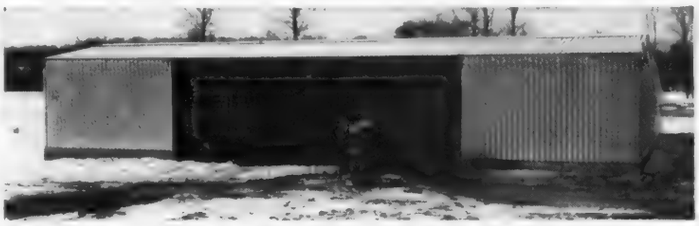

**Machinery storage plus repair center**—*Partly open side provides easy access to spacious storage area. Repair center and tool shop is in enclosed section at left. Initial investment of only 25% down for this 48' x 64' Stran-Master with choice of six colors.*

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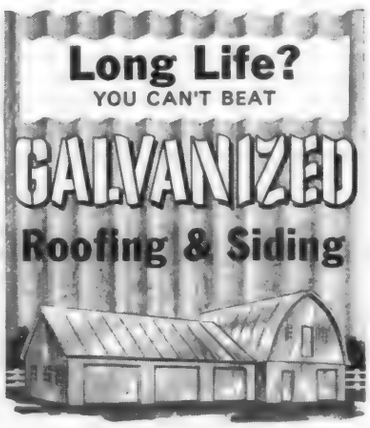


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too well ventilated. This occurs often on cold humid mornings in early spring or fall when the outside air is cool and there is a heavy dew or frost. Pulling more of this wet air into the building simply builds up moisture inside. This is one of the reasons for not using fans on uninsulated buildings. With "natural" ventilation there will be little air movement on such still mornings.

This is seldom a problem in insulated buildings. In these structures the interior wall is warm enough that the moist air does not condense on it.

Figuring ventilation needs in a tight barn is fairly simple. Researchers have learned how many cubic feet of air should be moved into a building per 1000 pounds of animal weight and how much ventilation equipment is needed for the job.

Cattle need from 50 to 100 cubic feet per minute of fresh air per 1000 pounds of animal weight depending on outside temperature. Figure the average Shorthorn, Brown Swiss and Holstein at 1400 pounds; Ayreshires, 1200; Guernseys, 1100, and Jerseys, 1000. Figure the total weight of cattle housed in the building and divide by 1000 to get the animal units. Next, select a fan or fans that will supply the needed air.

A fan with a capacity of 1600 cubic feet of air per minute will, in most cases, provide enough basic capacity for the needs of 13 dairy cows, 400 layers, or 500 broilers, 100 feeder hogs or 40 sows with litters. This is for tight and well-insulated buildings in the central United States.


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As the humidity inside a building increases a pressure builds up and forces vapors outward through the wall. These vapors condense against the cold wall and cause the paint to peel and wood to rot. Vapors can also ruin the insulating materials. The protection against this is a vapor barrier, a highly important part of insulation in any building. Vapor barriers turn the moisture back and keep the insulation dry. The most common kind is foil, although three coats of aluminum paint on the inside wall will help in cases where insulation is already installed.

A ventilating system must be flexible. Weather changes from day to day and the number of animals in a barn changes. The system must be geared for maximum demand yet be arranged so you can cut it back when it isn't all needed. It's better to have a fan or two idle part of the year than not to have them when they're needed most.

In fact, this is the only way one can have fully automatic control of temperature regulation. There must be extra fan capacity to cool on a hot day and controls to reduce ventilation on an extremely cold day.

Electric fans have solved many a ventilation problem. They are small and dependable and can be automatically controlled with thermostats. Actually, most cattle and hog barns could be ventilated with one large fan but it's more practical to have several smaller ones.

Most ventilation specialists consider the leeward side of the barn the best location for fan installations. The prevailing winds can be let into the buildings through louvers or other openings and exhausted on the other side. This creates circulation and gives the air a chance to pick up moisture more efficiently and carry it out.

The air intake system has to be fitted to the individual case. One system uses a series of evenly spaced 6 by 10 inch intakes, at the rate of one for every three cows. Baffles are used to prevent drafts on the stock. Windows, opened a fraction of an inch, can serve as temporary substitutes for more carefully planned air intakes.

Small electric fans equipped with baffles are sometimes used for intake purposes. They forcefully mix cold air with warm air and prevent condensation on the walls over which they spread the dry, mixed air. The usual fan exhausts are used with this system and both intake and exhaust are on automatic control.

With a well-planned ventilating system, a thermostat can be a combination hired hand and alarm clock. It should be carefully placed where it will get a true reading of the inside temperatures. It should be away from spots where it will be touched by sunlight, drafts or cattle. Usually, a shoulder-high location on a post in the middle of the barn is best.

Ventilation is worth its cost. No one, man or beast, enjoys living in a stuffy room.


THE AUTHOR: George Laycock, a free-lance writer and frequent contributor to The Farm Quarterly, lives at Batavia, Ohio.

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Wonder Building

## STORE, GRIND, MIX, FEED AND SAVE

(*Continued from page* 79)

five hours by five men."

An auger will work at any angle, but a gravity feed pipe must slope down. The angle varies with feeds. Any grain or pelleted supplement needs at least a 45-degree slope, and this rises to 60 degrees for any concentrate in mash form, such as soybean oil meal. But always use the steepest slope possible.

In the bin, the slope of the sides again varies with the feed. On a four-compartment bin, with two sloping sides and two vertical, the slope side angle should be at least 60 degrees from horizontal. This will cover any meal-type concentrate or mash feed not exceeding three to four per cent fat in the mixture. If there is more fat, the slope should be 75 degrees and the outlet opening increases to eight inches square, from the normal four.

How far and how much is the next question for a farmer planning an auger set-up. How far is simple; there are limitations to the augers. They vary with each manufacturer, but some generalities are: The maximum with one auger is between 30 and 40 feet vertically and up to 200 feet horizontally. There is no theoretical limit to the distances for augers in series.

It may not be economical to run an auger powered by one motor to the maximum horizontal distance. Extreme lengths make problems and several short lengths with separate motors may serve better.

The longer an auger stretches, the more critical is the construction. It needs support, and is a heavy load for one motor to start. But any length of auger is much more efficient and long lasting when well made. When buying auger lengths, check these points: sealed bearings; drive from either end of shaft; flighting (the spiral part) welded frequently to shaft (every turn if possible); heavy gauge flighting (12 to 14); welded piping (crimped pipe can leak); pipe smooth inside; absolutely no bumps (with a smooth tube, there may be higher initial, but lower operational, cost); strong motor mount (to give good positional fit of the pulley belt and maintain the drive); lastly, a large discharge opening (to prevent damming up).

Finally, comes the tally on how much the augers will carry. Using four inches as the most common diameter, some figures published by LML Engineering and Mfg. Corp., Columbia City, Indiana, will give a working average. (The booklet is available from the company.)

| *Horizontal*: Auger speed: | *Cornmeal bu/hr* | *Oats bu/hr* | *Wheat bu/hr* |
|---|---|---|---|
| 400 rpm. | 330 | 240 | 260 |
| 600 rpm. | 580 | 320 | 380 |
| *Vertical*: Auger speed: | | | |
| 400 rpm. | 180 | 60 | 90 |
| 600 rpm. | 240 | 100 | 130 |

Enough of calculation, how about people? Many mills are operating, and more are being built. No one seems to have "finished," there is always something to add.

An extremely simple setup is one of the systems planned by Duane Dahnert to feed hogs and hens on the father and son farm of George and Wayne Bark, Hinckley, Illinois. With his father popping busily in and out of the conversation like punctuation in a fifth grade essay, Wayne Bark explained, "We installed this mill with gravity feeding

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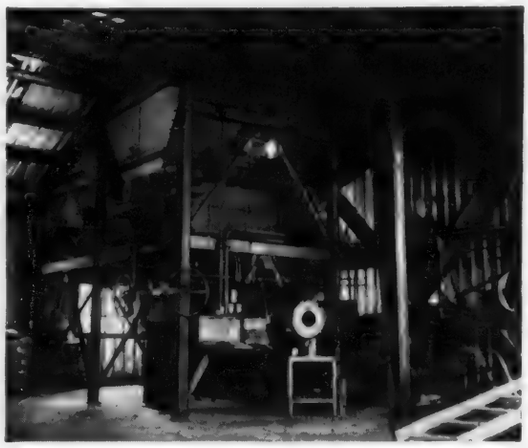
Deseret Farms worked with their local Butler Builder who helped them plan the most efficient use of Butler structures.

Pre-engineered, pre-fabricated Butler components offered exceptional flexibility, speed and economy of construction . . . from the smallest scale house to the largest storage building.

You too, can profit from a modern Syste-Matic farming center. With its complete range of components it can be adapted to any size farm with the same modern materials handling principles. Call your nearby Butler Builder. Ask him about Butler financing, too. He's listed in the Yellow Pages under "Buildings" or "Steel Buildings."



**Heart of the Syste-Matic Feed Center** is the control room shown above. Note how Butler clear-span construction gives column-free floors and truss-free overhead areas. There's plenty of clear, unobstructed room to maneuver, stack or suspend equipment.

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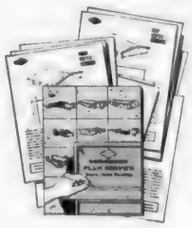

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bins in our corn crib. It works better than we thought it would. ("The mill," said his father.) And just anyone could have one—well, this old crib of ours is as bad as they go and it works fine in here. We thought at first it would grind too slow, it does three tons in about two hours, but then we learned to do other chores while it was working. The feed delivery auger is movable; that was Dad's idea ("Yes, put that in," said his father.), so we can lower it from up there above the self-unloading wagon. That way we can grind a pail of starter feed for a few pigs, or a wheelbarrow full for the milk cow." Bark's installation, done in part by himself, cost around $1,000.

For a more complex operation, take Warren Frye, with a mill and feed handling system on his Peoria, Illinois, poultry farm. He has 35,000 bushels of grain storage in metal bins. He feeds 16,000 turkeys a year and turns out 5,000 caponets every eight weeks, packaged from the farm.

Frye has the mill in one corner of a shed that was first intended as a turkey house, but later was given a concrete floor for implement storage. He grinds ten or twelve hours a day at the height of the turkey season, dropping down to three hours when stocking is light. The turkeys eat a ration of corn, oats, soybean oil meal and a premix, pelleted, which Frye buys. The chickens have a similar ration without oats. His mill was installed over two years ago and Frye has enlarged his storage constantly as his operation grew. Slowly a circle of bins

## This poultry house cost only 96¢ a square foot

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## Discovery of treatment promises vast savings

Lungworms have been found to be infecting an alarming number of livestock throughout the United States. Now after years of research and testing, a new discovery—Dictycide—is proving to be the first safe, practical, effective treatment for lungworms. Dictycide rids animals of these hard-to-reach parasites that ordinary wormers don't touch.

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*Fort Dodge Laboratories, Inc., Fort Dodge, Iowa*

**Q. What are lungworms?**

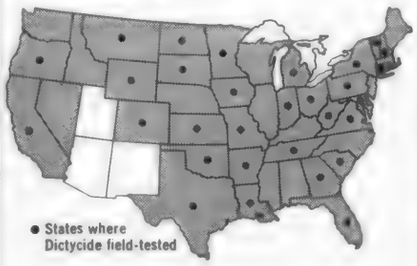
**A.** Lungworms are fine, thread-like worms which develop in the air passages of animals.

**Q. What animals are affected?**

**A.** Of dollar importance: swine, sheep, beef and dairy cattle. But also goats, deer, elk and others.

**Q. What symptoms do animals show?**

**A.** Depending on lungworm load and type of animal: unthriftiness, coughing, fast breathing, protruding tongue, and thumping.



● States where Dictycide field-tested

**Q. How prevalent are lungworms?**

**A.** Lungworm infection has been reported in 45 states (shaded). In some areas, infection of more than 50% of animals is estimated.

**Q. How does Dictycide benefit?**

**A.** Dictycide causes adult lungworms to move out of lungs, up windpipe, into throat. As they are swallowed, they are destroyed in bowel. Treated animals improve within a few days, appetite returns, gains and milk production are restored.

1959 National LIVESTOCK LOSS PREVENTION Year

## Consult your veterinarian

*he knows best—what's best*

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THE SPECIFIC FOR LUNGWORMS

is enclosing the grinding shed. Although he moves all his ground feed by wagon, this is soon to end. He is installing a pneumatic conveying line from the mill to his turkey and chicken houses. This one-inch pipe will carry the feed underground between buildings to a maximum of 800 feet away. The feed enters the pipe at a special air lock. The fan is designed to inject just the right amount of air, and this is much more critical than with a regular blower. When the correct proportion of air and ground feed of certain size are mixed, the mixture behaves like a liquid—it can go around corners and up and down with ease.

Frye has about $10,000 in storage buildings, but cautions, "I bought some of them at government surplus, and I couldn't replace them for that today."

This smallish, dark man is enthusiastic about his installation: "It's hard to get the saving down to dollars and cents," he said, "but it's about the best investment I have on the farm. We can make feed for $10 to $15 less per ton than we can buy it." Frye plans soon to be able to add antibiotics or wormer to his ration, and this calls for an accurate, continuous measuring of small quantities. He is installing a vibrator.

Dan Sinn, on his Tremont, Illinois, poultry farm (44,000 turkeys, 25,000 caponets last year) has such a vibrator. The machine, made by Eriez Manufacturing Co., Erie, Pennsylvania, is a gentle sloping trough, shaken at high frequency by an electric vibrator. By altering the slope and size of the trough, and the depth of the material in it, the flow can be varied. It can range accurately from 2 to 200 pounds flow an hour.

Sinn, with graying hair, and a Humphrey Bogart smile, said, "We use it to feed antibiotics into the Decker mill. It's o.k. for anything that crumbles, but antibiotics tend to cake a bit. We are thinking of getting an agitator." He uses the mill regularly when the turkeys are growing, changes settings as he moves from starter to grower rations, and feels he "saved quite some money last year" with his simple mill installed in a single-bay corn crib.

Russell Jeckel uses ground corn as a premix carrier, and feeds the premix and corn straight to the mill by auger. Some corn is ground twice. He uses a small batch mixer to compile the premix. His hog operation, 210 acres near Delevan, Illinois, finished 2,800 hogs last year. He built a new building for the mill, and has two bins, for soybean meal and shelled corn, outside. Two inside bins and an auger feeder wagon complete the $7,000 set-up.

His hogs are raised in the field, and he fills his self-feeders as necessary. "A hundred minutes fills either one of the inside holding bins or the grainovator wagon," he explained. Jeckel, a very tall, well-built man, is very pleased with the system. "My total upkeep since installation in January, 1958, has been less than $50—that's two screens, and two sets of hammers for the mill. I find the hammers last about 700


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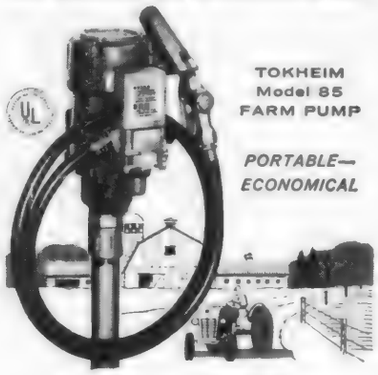


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tons, and the screens are about done, too. We find using bean meal for the hogs as the protein means quite a savings, almost as much as the grinding," he said. "And then buying bulk means we get a little better price. We use a half-inch screen—that's a little bigger than most folks, because the mill will put out 2,500 pounds an hour with it. Some days we grind 12 hours—but it only costs us an average of $10 a month to mix and grind. That's with nine augers and a total of ten horsepower. It's a pretty cheap hired hand, and one of the most dependable."

But Russell Jeckel is far from finished. Within a year he plans to have two concrete storage silos for grain, a total of 30,000 bushels, sitting just across the road from his processing shed.

One thing all these farms have in common is the long-term plan. None of them have finished their feeding operation; they are always looking to the future. After some years absence, grinding and mixing have returned to the farm.

## SHEEPMEN AND THE MARKET

(*Continued from page* 47)

leaves $18.15. The lamb dresses out at 47½ per cent. The carcass as it hangs in the cooler costs the packer about $18.45. He can't get more for it than $18. He loses money. And I haven't added the commission or the cost of slaughtering."

Aubrey has no logical explanation for this phenomenon—a packer continuing to operate at a loss. "I suppose he makes it up in good time," he said. "In a good many ways he's like the feeder. A feeder will buy a bunch of lambs at 24 cents and sell them for 20 cents and figures out that he has lost $5 or $6 on every lamb. But next year he does the same thing and stays in operation. I guess it's mostly momentum."

He does have a logical explanation for the farmer's economic gymnastics wherein he makes money at the same time he loses money. "Take a case," he says. "A feeder buys a 75-pound lamb in August at 24 cents per pound. The lamb costs him $18. He turns him out to clean up his cornfield and he gets a good deal out of a cut-over alfalfa field, too. By Christmas or a little later he weighs 110 pounds. At $20 a hundred he brings $22. The feeder figures his feed at nothing for he couldn't market the corn, and he's trading it for the manure from the lamb; he doesn't figure his time at all, so he's made $4 on the lamb.

"The price of slaughter lambs on the market has relatively little effect on the price of feeder lambs," says Aubrey. "It's similar to the situation that exists in feeder cattle. Most of the fat lambs that are coming in here now cost $24 or thereabouts as feeders. Some of these are fine lambs, but the tops won't go over $20.

"I can't tell you much about how a farmer should breed and feed his sheep," Aubrey continued, "but I know what I want here on the market. The perfect lamb


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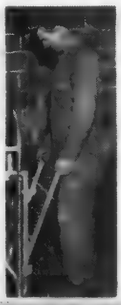

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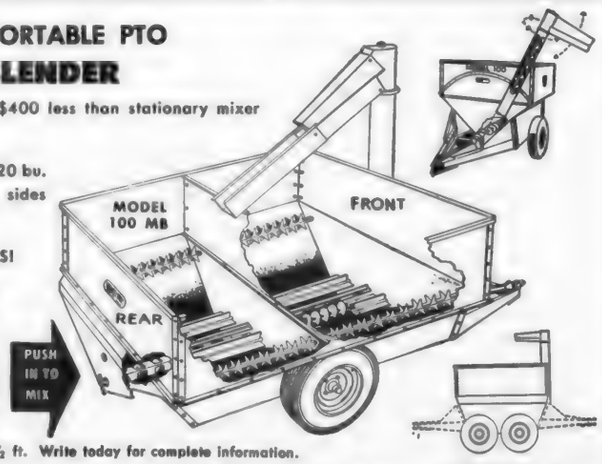



Also available as attachment—buy Model 100 auger box now, add mixer-blender kit later. Converts also to bulk delivery unit — discharges any height from 33 in. to 16½ ft. Write today for complete information.

**HELIX CORPORATION** Dept. 2-I **CROWN POINT, IND.**

Both front or rear delivery—any time.


weighs 100 pounds, a little over or a little under. This is not the weight that sells best on the counter, but it's the best weight for the feeder and the packer. The 100-pound lamb is a sort of compromise between what the feeder can market profitably, what the packer can dress out profitably, and what the retail market wants.

"He's blocky and short-coupled and he has a good covering of fat. He should be unshorn from the time of his birth else I'll take off $1.50 or $2.00 this year. There is an exception to that; we get a few summer-shorn white-faced lambs with tight wool; if the wool is an inch or so long and good quality the pelt can be sold for mouton, and there's no penalty. What we don't want is a long, lean lamb.

"To my mind, the best feed for fattening lambs is cracked corn and the best lambs we get here come from Illinois, Iowa, Nebraska and Kansas, finished on corn. One of the best things that ever happened to the sheep business was the use of lambs to clean up a grain field."

Everybody at the sheep pens has a monkey on his back. With some it's scabby, wormy lambs. Aubrey's one particular monkey is a lamb with wild oats or spear grass. "I shudder when I see wild oats or spear grass sticking in the wool," he says. "I know some of it has worked down into the flesh and will damage the carcass. Sometimes wild oats will entirely disappear in the wool and the lamb looks good; but when you dress him out there'll be wild oats in the flesh and that has to be cut out." Aubrey and his fellow buyers, whether they are buying for a particular packer, or a group of packers, or a chain, are interested in buying at the lowest possible figure. On the other side, representing the farmers, feeders, and dealers, are the commissionmen, or producers' agents.

These two groups carry on guerrilla warfare against each other, often with exaggerated politeness, usually with smooth diplomacy. Take Aubrey Williams and lanky, bespectacled Wally Desmond, a veteran sheep salesman. They approach a pen of sheep, one to buy and the other to sell, very much like two prime ministers at a summit meeting.

"What have you got today, Wally?" (solicitiously) "I have some beautiful stuff, Aub. Beautiful" (with great sincerity). "Where?" (innocent curiosity). "Right there!" (coldly). "Are those lambs?" (alarmed incredulity). "Why, you low-down, swine-herding cowpoke, those are the best lambs to hit Chicago this month." Aubrey (innocently), "Oh, I thought they were jack rabbits."

After a session of delicate sparring, adroit bargaining and downright haggling, Aubrey finally buys the lambs at 50 cents more than he wanted to pay and Wally lets them go at slightly less than he had hoped for. Both are reasonably happy knowing they have done their best for their clients.

It's a game enjoyed by the Aubrey Williams and Wally Desmonds in every market.

# Have Jacobsen – will travel

**(IT'S THE ESTATE 24)**

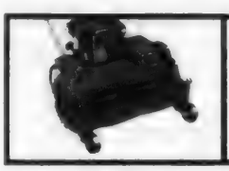
And travel it does, smoother, safer, easier than any power mower you ever imagined. You sit tall in the saddle, wave to the neighbors, put the Estate in gear, and you're off over the lawn.

Man—that's living! Look behind you. That's mowing! Smooth, wide and handsome and why not? The design of the Estate 24 shear-cut reel mower set the pattern for the Jacobsen Putting Greens Mower, famous as the finest precision mowing machine made, and preferred on a big majority of America's golf courses.

You'll have more fun, spend less time and have a better looking lawn when you ride the Estate 24. If it is more mower than you may need, your Jacobsen dealer can tell you about the other twenty-three reel or rotary models (priced from $74.50), that carry the *first* name in power mowers—Jacobsen.

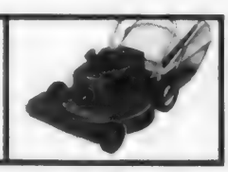
ESTATE 24 FACTS: 24 in. cutting width, trimmer type, 3 hp Jacobsen Hi-Torque engine. 6-blade reel. Model 8A with conventional "walk behind" handle, 2 wheel drive, **$355.00**. Model 8B with full roller drive, **$375.00**. Model 62 Riding Attachment as illustrated, **$77.50**. Electric starter, grass catcher, spiker-aerator, and straight blade snow plow, extra. *One-year Warranty*. All Jacobsen power mowers are factory warranted against defects in material or construction, for one year.

**NATIONWIDE SALES AND SERVICE.** Look in your Classified Phone Directory under "Lawn Mowers" for your local Jacobsen dealer, or write factory. Also in Canada.



**The Velva-Trim** Trimmer type, high speed 6-blade reel, 18 and 21-inch cutting widths. $149.50, $169.50.

**The Turbo-Cut** Model 35C. Power-Propelled. Features exclusive Suction Lift Disc. 21-in.cutting width.$159.50.



**The Turbo-Vac** Model 75 grass catching rotary, *vacuum cleans* as it cuts. Safest rotary made. 18-inch cutting width. $139.50.

*Feature for feature—the finest!*

# Jacobsen

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Subsidiaries: Johnston Lawn Mower Corp., Brookhaven, Mississippi • Worthington Mower Co., Stroudsburg, Pennsylvania

Elmer Loeb, Laporte City, Iowa, shows corn he dried with his CLAY Crop Drier

# Can you make an extra $1,128 per year from your corn crop?*

***Elmer Loeb of Laporte City, Iowa, did***

A CLAY Crop Drier can help you increase your corn profits. First, a CLAY Drier lets you pick your corn at about 30% moisture content. At this stage, you are able to save more of the corn you've raised. Field losses due to corn borers or shelling are at a minimum.

Second, a CLAY Drier enables you to store your corn until the market is right. Even in wet years, you won't have to sell your corn at picking time, when the market is usually lowest and when your corn will not grade very well.

### How One Owner Saved $1,128 in One Year . . .

Elmer Loeb of Laporte City, Iowa, bought a CLAY Crop Drier recently. Here, Mr. Loeb tells in his own words, how his CLAY Drier saved him $1,128 in one year.

"I sold 4,000 bushels of corn recently which was rated as No. 2 Cereal. When I told the buyer that I had used a CLAY Crop Drier with the optional Desert Aire Heat Unit, he couldn't believe it. The corn showed no signs of being 'cooked', but was just plain beautiful.

"When the corn was picked, corn was selling in our area for 80¢ per bushel. By drying my corn and storing it until the market went up, I got $1.13 a bushel. This meant an extra 33¢ per bushel. 33¢ x 4,000 bushels adds up to $1,320 more for my corn.

"My drying costs were $192. This included fuel for the tractor (I use the PTO model CLAY Drier) and fuel for the heat unit.

"My extra income was $1,320 less $192 . . . or $1,128. My CLAY Crop Drier cost me $685. As you see, *it more than paid for itself in one year.*

"Now I'm considering expanding my operation and making even greater use of my CLAY Drier. It's one of the few pieces of equipment I own that makes money for me.

"The CLAY Crop Drier is portable — easy to move. I just put it here in my machine shed during the winter — sure is convenient."

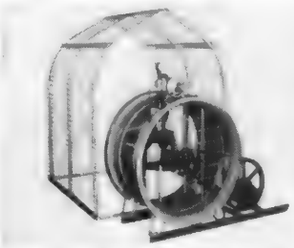
### What Will a CLAY Drier Save You?

Perhaps a CLAY CROP Drier would save you less money than it did Mr. Loeb . . . perhaps more. The amount that a Drier will save you will depend upon the amount of corn you grow and on weather conditions in that particular year. But one thing's almost certain . . . *over the years, a Crop Drier is going to pay for itself many times over.*

A CLAY Crop Drier works on the basic principle of natural air drying. Unheated air is forced through the grain, removing the moisture. Natural air is recommended whenever possible due to the higher cost of heated drying.

### Auxiliary Heat Unit Available

However, heat is sometimes helpful. If you run into poor drying weather, you may want to use the optional CLAY *Desert Aire* Burner. This burner generates up to 1,000,000 B.T.U.'s. It is completely safe and will not scorch or cook your corn.



Clay Natural Air Crop Drier. Use on both hay and corn. Completely portable.

### Ask About CLAY Purchase Plan

CLAY's Purchase Plan lets you buy your Drier now and pay while it's saving you money. Make a 20% initial investment and take up to 3 years on the balance. Your Drier can pay for itself long before that.

For more information on the CLAY Purchase Plan or CLAY CROP Drier, write to CLAY . . . *today.*

**CLAY EQUIPMENT CORPORATION**
694 Fulton Street, Cedar Falls, Iowa

Under its rules the livestock of the country is moved in an honest and business-like manner, for which the farmers can be thankful.

On the subject of terminal vs. country markets or on-the-farm sales, Wally Desmond vehemently maintains the farmer gets his best break on a terminal market. Most lambs bought on the farm are bought under agreement they must meet a specified weight after delivery. "There's a catch in this for the farmer," Wally explains. "Lambs will lose at least five per cent between the farm and the delivery point, where they are weighed. They are not fed or watered and the farmer takes this loss. Now when they come to a terminal market, such as Chicago, they have feed and water in front of them the moment they are put in the pens. They'll fill up and there'll be hardly any shrink. See that bunch of lambs there? Those are Iowa lambs and they'll weigh as much as when they left Iowa. They are thirsty after their ride and so full of water right now you could crack a tick on their bellies."

Grading, too, Wally says, can backfire on a farmer. "Most farmers, even the best, have only a vague notion how a lamb is graded for the market. That gives the buyer an edge if he wants to use it. Here at Chicago there are so many people looking right down your throat you couldn't get by with offgrading a lamb, even if you wanted to—and we don't want to.

"Another point is, if our runs are reduced here at the yards we may not get enough lambs to really establish a market. In small runs of 2500 to 4000 there are too few of some grades to establish a true price.

"We get very few reputation lambs here at Chicago. Most of them are grabbed on the farm by buyers for packers who want a special quality product. There are a few buyers here who will pay a small premium on small lots if they are strictly prime."

Both the buyers and sellers at Chicago, as well as those at terminals all over the country, have another big gripe about "country selling." Ernie Beilfus, of the Chicago Producers', sadly tells about this angle. "We've had more scab here in Chicago this year than we've had in fifteen years. Most of it we can trace right back to the country auctions. Most of these auctions have state

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# BULK UNLOADER
***FAST, ECONOMICAL HANDLING OF ALL FEEDS AND GRAINS***

Efficient use of flat bed trucks for either bulk or bags. Equipment designed to handle mixed feeds, pellets or crumbles, whole grains, etc. Multiple purpose use of existing trucks now economically possible.

**INSTALLS ON YOUR FLAT BED TRUCKS FROM EASY TO FOLLOW PLANS SUPPLIED WITH EACH UNIT.**

Unloading pickup is recessed in floor of truck bed. 14 ft. off-loading boom will rotate 360 degrees and may be elevated 14 feet above truck bed (approximately 18 feet above ground) using built-in hydraulic hand pump. Entire unit operates from power take off.

***FARM TO MARKET or MARKET TO FARM—BULK or BAGS***

**Wenger Mixer Manufacturing**
SABETHA, KANSAS PHONE 111

inspection but few have federal inspection. Lambs from ten, twenty farms are run together at the auction and if one bunch has scab they're all likely to get it. They're supposed to be dipped but this is either a careless job or overlooked altogether."

### When to Sell, When to Buy

The best time to sell old ewes, the stockyards experts agree, is in January, February, and March. Numbers are light at that time and by April Texas sheep begin to come in. Flocks are culled in summer, and in the fall the culls of the western ranges move to the markets. Generally, the lamb market does not swing through to the peaks and valleys of the hog market.

Feeder lambs are being finished beginning in October, but by December they are running heavy and continue heavy (in weight) until the last of March. For heavy lambs, June and July bring the best market. In November, lamb runs head-on into turkey and again at Christmas time. Then poor pastures in the West can knock a normal market into a cocked hat when the ranges are unloaded. A ewe normally lambs in spring and the best market comes when the extra early spring lambs come in. As the numbers increase in the fall and early winter the market normally weakens. April and May are generally good.

Happenings on the western ranges can have an amazing affect on the market. A drouth, a flood, too much or not enough grass, a hard winter or a soft winter, can all have repercussions on the market.

There is a difference of opinion among yard men about the effect of the booming poultry binge the American public has been on since fowl meat became the cheapest on the grocery list. Some say it has affected the sale of lamb, but no more than it has cut in on the sale of beef and pork. Williams has this to add as a dissenter: "Poultry is cutting in on lamb more than it is on beef or pork," he says. "And there's a very good reason. When a housewife wants something special for her family beyond the beef and pork she buys daily, she might turn to lamb if she didn't look at the price of poultry."

### What About the Future?

After reaching a peak of 56.2 million in 1942, sheep numbers declined until 1950, when they hit 29.8 million. There has been a slight increase since then with current numbers around 31 million. This may be an indication of what farmers and feeders believe, or feel about the future of sheep. Certainly most sheepmen will not be buying a Rolls Royce with the price of wool where it is, and with lamb and mutton a secondary meat on the dining table. If there is a swing to wool, and the housewife can be induced to buy more lamb, the sheep feeders can look for better times. If one knew how to accomplish these laudible and reasonable goals, he wouldn't have to buy and sell sheep on the market.


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***SELF FEEDING PAYS — IN MANY WAYS***

**For 35 Years The Only Truly Waste-Free Hog Feeder**

**NO EXPENSIVE FEED WASTE**

Now you can use the same Smidley Feeders being used by all the leading swine-experiment stations in the United States, who buy them because they are the only truly waste proof feeders on the market.

***Designed to:***

- ★ HANDLE PELLETS AND SHELLED CORN
- ★ CUT LABOR COSTS 80%
- ★ FEED ALL GROUND FEEDS
- ★ FEED BEEF AND DAIRY CATTLE
- ★ GET 10% FASTER GAINS
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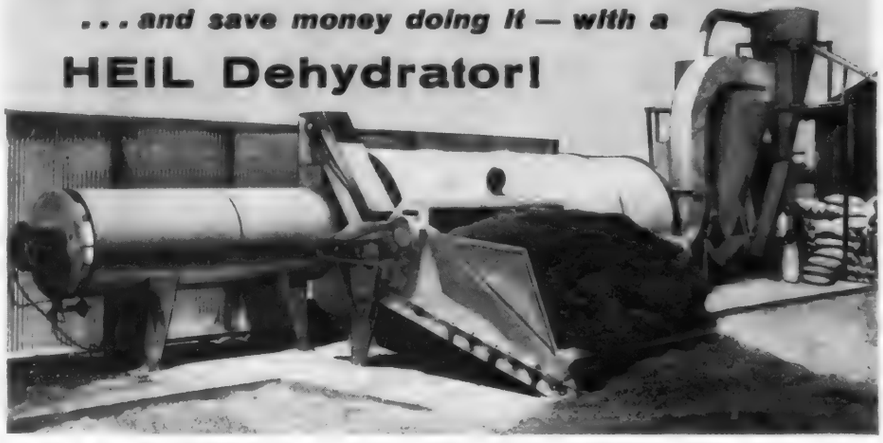
***. . . and save money doing it — with a***

**HEIL Dehydrator!**



With a Heil Farm and Ranch Dehydrator you can harvest more alfalfa on the same acreage . . . because you save it all, suffer no leaf shattering or weather loss. And you will usually get an extra cutting, because with a dehydrator you harvest your hay at its nutritive peak before it blooms. Fed to livestock, dehy takes the place of protein supplement. Beef cattle show substantial increases in gain and dairy cows show production increases up to 15 percent.

Save valuable protein, Vitamin A and other health and growth factors in your hay with the Ardrier Farm and Ranch Dehydrator. ***Write wire or call —***

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*(Manufacturers of the Arnold Dryer)*

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Please send me more information:

- ☐ For farms with 100-500 acres of forage crops.
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**FREE!** SPARK PLUG INSPECTION CHART

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**AUTO-LITE®**
**SPARK PLUGS**


## LIGHTNING, THE DESTROYER

(*Continued from page* 54)

that you cease to be the "highest object in an area." The hair raising means positive charges from the earth are building up in your body, and these may invite opposite negative charges from the sky A meeting of the two would cause an explosion somewhere in the vicinity of your head.

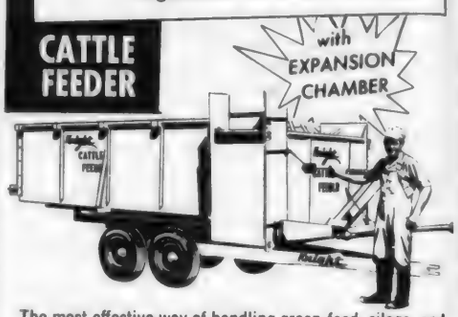
The most dangerous time is as the storm is approaching, before the rains come, when the sky is dark and the black clouds are rolling. At such times the air actually feels charged. The most dangerous places are in a boat, in the water swimming, atop a hill, under an isolated tree, near a wire fence, wire clothesline (a wire clothesline should never be attached to a building), near steel towers or overhead wires, riding a tractor, bicycle, or horse.

If you are inside a steel framed building, a building protected by lightning rods, or your car, you are fairly safe. However, once inside, especially an unprotected building, stay away from the telephone, radio, or television, stay away from the fireplace, the bathtub and the sink, and don't stand near an open door or window.

Lightning causes two out of every three farm fires. Farm fires tend to to be totally destructive for a number of reasons. Buildings are often of all-wood construction, are often filled with highly combustible contents, such as hay. Both buildings and contents burn quickly; fire-fighting equipment

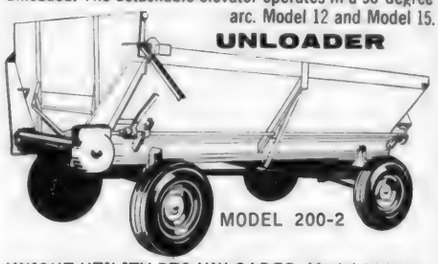

**KNIGHT IMPLEMENTS**
*Engineered for Better Farming*

**CATTLE FEEDER**




The most effective way of handling green feed, silage, and supplements. A PTO powered front end unloader with all steel construction. The "Expansion Chamber" feature is an area that is wider than the rest of the box which allows the compressed green feed to expand so that it is easily unloaded. The detachable elevator operates in a 90 degree arc. Model 12 and Model 15.

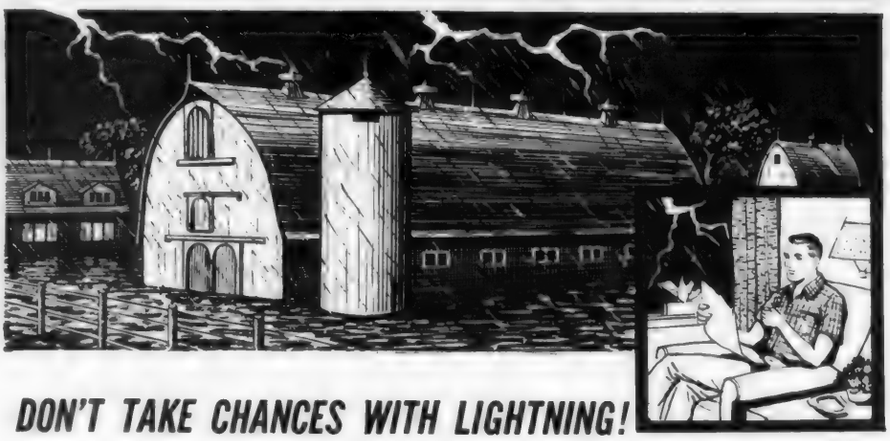
**UNLOADER**




KNIGHT UTILITY PTO UNLOADER, Model 200-2—An all-steel box available with wood top rack Ideal for combining, corn picking, silo filling, handling green feed and grain. Designed for rugged use.

WRITE FOR *Free* BROCHURE

**Knight MANUFACTURING CO.**
BRODHEAD, WIS.



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**LIGHTNING CAUSES 37% of all FARM FIRES**

**Over $100,000,000 Annual National Lightning Losses**

**Don't Be Among 30,000 Losers this year!**

**Write Today — to a Sponsoring Member of the Lightning Protection Institute Listed Below, for All New Installations—and Reconditioning Jobs.**

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**Write for FREE Booklet "LIGHTNING FACTS and FIGURES" Direct to: Dept. F**

**WEST DODD LIGHTNING CONDUCTOR CORPORATION**
116 West Lafayette Street, Dept. F,
Goshen, Indiana

**LIGHTNING PROTECTION INSTITUTE**
**53 WEST JACKSON BOULEVARD, CHICAGO 4, ILLINOIS**

is often not available.

Farm buildings are usually isolated from other potential targets for lightning, and all too often are the highest spot on the farm.

Lightning kills thousands of farm animals every year. The loss may be one solitary animal caught in a storm on the brow of a hill, or a hundred huddled together in a sheltered spot. Ferdinand Pluger, of Pella, Wisconsin, lost his entire herd of dairy cows when lightning struck a tree under which they had sought shelter. A single stroke killed 504 sheep in Utah.

In spite of the greatly increased number of lightning protective systems being installed on farms, damage has been increasing. Safety experts say the principle reason for this increase is that more metal is being used on farms, principally electrical equipment. Overhead electric wires from the house to the barn and other buildings, and metal water piping systems within buildings increase the hazard.

Modern lightning protection systems, properly installed, afford almost total protection against lightning when it does strike, and to some small extent even prevent lightning from striking at all.

The basic metal of a protection system is copper. Some aluminum is being used, but copper is more durable, and is a better conductor of electricity.

The theory of how a system protects is simple: the electrical charge of a bolt is caught and conducted harmlessly to the ground or air, where it is dissipated. The design and installation of a system which will meet the specifications of insurance inspection and merit the "Master Label" of the Underwriters' Laboratories is a job for a technician and not a do-it-yourself task.

The high-frequency discharge of a bolt of lightning requires parallel paths, arranged according to a pattern, with one or more air terminals, and two or more ground electrodes and connecting cables. The shape and design of a structure will govern the number of electrodes and paths necessary. Single ridge structures, with no ells or tees, up to 80 feet in length require two ground terminals. Larger buildings will require more. Projections from the building, lower than the ridge, such as a dormer, will require, under certain conditions, contact with the conductor cable, and frequently an additional ground electrode.

The basic portion of the system is the familiar ground electrode, which should be sunk to a depth of at least ten feet. The cables are attached to the ground electrodes, coursed up the corner post to the rafters, up the face rafter to the ridge, along the ridge to the diagonal corner and down to the second ground electrode, completing a ground-to-ground circuit. This may be concealed within walls in new construction. The 10 to 12-inch air terminals have copper bar points, and are attached to the ridge cables by a saddle.

It is from these points that the charges from the earth are dissipated into the air. As these charges build up they flow to the


"OCEANE" Grand Champion Charbray Female 1959 SAN ANTONIO LIVESTOCK EXPOSITION

"OCEANE 153" of

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LATHROP, MISSOURI

McGinness Brothers "Oceane 153" was selected Grand Champion Female and "Dorothy's Pride" won Top Yearling Female honors at the 1959 San Antonio Livestock Exposition. They are but two of many champion bred, registered Charbray and Charolais cattle on the McGinness Brothers Ranch at Lathrop, Missouri.

Add hybrid vigor to your herd with Charolais-Charbray bulls. Get calf crops that mature in record time — thrive in any climate — making a higher percentage of profit for you. Fifty yearling heifers available now.

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Please send me your new brochure illustrating the advantages of cross breeding with Angus, Hereford, Shorthorn and other poular breeds.

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NEW! ALL-STEEL BUNK FEEDER

At last! You can own a big capacity, fast unloading, long lasting *all-steel* bunk feeder for less than most ordinary wood-box unloaders!

Also available in rear unloader—with or without power beaters.

125 to 325 Cu. Ft. Capacities With Giant 4-Bar Beater to Every Panel

4-bar power beaters thoroughly mix-in feed supplements or preservatives . . . exclusive Convey-O-Matic *all-steel* floor *floats* the load . . . can't pack, won't clog.

- Full length, steel link conveyor floor.
- Completely self-cleaning, self-aligning, rust and corrosion resistant.
- Lasts longer because body is *all-steel*.
- High speed cross conveyor gives 3 to 4 ft. "gun-shot" delivery. Extension Elevator available (extra) where needed.

100/100MB Auger Box Mixer-Blender

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Sorb-O-Matic action keeps giant rope rubbing-element fully saturated. No pump. No valves. No waste of oil. No service problems. Insecticide is released only as cattle rub. No installation problem. Hang them anywhere. Fill them and forget them.

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SUMMER BULLETIN NO. 2

## "I guard against mineral deficiencies by feeding Blusalt!"

**. . . says Robert B. Thompson, leading dairy farmer and mayor of Salem, New York.** "I offer Sterling Blusalt and steamed bone meal free choice in two pasture feeders. I also mix 20 lbs. of Blusalt in each ton of grist and toss 2 ounces on top of each cow's daily silage ration. This 3-way feeding of Blusalt does more than supply my high producers with the salt they need, because it contains *seven trace minerals* which protect my herd from mineral deficiencies."

Mr. Thompson grows all his hay, corn and oats on 60 tillable acres of his well-kept 112-acre farm. When preparing feed, he adds a 30% commercial concentrate in addition to Blusalt. Thanks to his continuing program of efficient livestock care and feeding, Mr. Thompson's 42-head herd of Ayrshires produces milk at a profitable high level.

# Is mineral-deficient pasture costing you money?

Are some of your animals "off their feed," developing unhealthy coats or failing to gain properly? The trouble may lie in mineral-deficient pasture. In some areas, these deficiencies are severe enough to cause heavy profit loss. Why take a chance? There is an easy way to supply minerals and help protect your livestock health and profits.

Simply use Sterling trace-mineral Blusalt in place of plain salt in your grist mixes and feed Blusalt free choice on pasture. In addition to the quality salt needed for high milk production, Blusalt supplies *seven* trace minerals in scientifically derived proportions . . . thus compensates automatically for mineral-deficient pasture. What's more, economical 50-lb. Blusalt blocks can be used for effective pasture rotation: animals follow the salt and will graze in the areas where you put your blocks.

Here are the minerals in Blusalt and how they contribute to healthier, more productive animals—all summer long.

**Manganese:** necessary for successful growth, reproduction, lactation and bone development.

**Iron:** essential, as part of hemoglobin, for the proper function of every organ and tissue of the body.

**Sulfate Sulfur:** utilized by the millions of bacteria in the rumen to make essential sulfur-bearing amino acids, the building blocks of protein.

**Copper:** works with iron for hemoglobin formation and various enzyme systems.

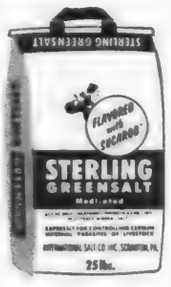
**Cobalt:** needed for Vitamin B-12, which prevents loss of appetite, permits maximum body gains and helps maintain normal level of hemoglobin in the blood.

**Iodine:** prevents simple goiter.

**Zinc:** growth-producing and a part of enzyme systems.

For further information on the trace-mineral needs of livestock, whether on pasture or dry lot, contact International Salt Company's Animal Nutrition Department in Watkins Glen, New York. No cost or obligation.

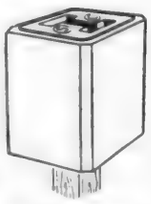
## SUMMER REMINDER: You can control internal parasites by feeding pheno-fortified Sterling Green'salt




Shown is the 25-lb. bag with its own carrying handle. Green'salt also comes in 100-lb. bags.

It's a recognized fact that animals on today's heavily grazed pastures are more prone to attack by internal parasites. One of the best ways to minimize this danger is to feed your dry cows and young stock Sterling Green'salt.

Green'salt is premium-quality trace-mineral salt fortified with 10% phenothiazine, the drug found most effective in controlling parasites. You can feed it free choice, mixed in feeds at the 1% level or added on top of feeds.



Ideal for feeding salt free choice on pasture, 50-lb. Sterling Salt blocks come plain, iodized, sulfurized, or with trace minerals. At your feed dealer's.

## IMPROVE PALATABILITY, DECREASE DUST BY SALTING STEMMY HAY

Early-season hay is often stemmy and musty because of heavy rainfall during April and May. The same is true of late-summer hay if there's a long dry spell which retards leafy growth. It's difficult to restore completely the feed value lost through these unfavorable curing conditions, but in both cases you can greatly increase palatability and reduce dustiness with salt.

For early-season hay, the recommended practice is to add 25 lbs. of Sterling Granulated Salt per ton when putting hay into the mow or stack. In the case of late-season, drought-ridden hay, you should add Sterling Salt on top of the hay when you feed it. Both practices are easy . . . both provide better nourishment for your livestock.

Service and research are the extras in

**STERLING FARM & FEED SALT**

**MAKERS OF STERLING... REAL SALTY SALT!**

highest point in the area along the best conductor—the ground electrode and the cables and to the rods. From the densely charged points of the rods the static electricity leaks off into the air. When the charging rate exceeds the dissipation rate the potential rises high enough to break down the resistance of the air, and a stroke of lightning occurs.

There is more to a system than the ground electrodes, cables and terminals. The modern system includes a somewhat complex interconnection with water pipes, metal eaves, vent stacks, down conductor pipes, door tracks, feed and hay carrier tracks, ventilators, electrical, radio, and telephone grounds—any and all masses of metal which may be conductors or inductors. A stroke of lightning will charge these metal masses and unless they are brought to the same potential as the lightning protection system, will cause a side or secondary flash which may be as destructive to the building as the primary stroke.

Lightning protection systems installed before the water system afford inadequate protection for a piped building. Lightning may even follow a water pipe underground, gathering negative charges, and arc to the wall of a building at the entry point, causing fire or shattering. A metal building, or a metal-clad building (roof and walls of metal), may be a fair protection in itself. However, the metal must be connected and there must be sufficient grounding. Rods are used on metal buildings, but the metal roof itself serves as the conductor, and the rods are soldered and bolted to the roof.

Another piece of equipment which the older systems did not have, or in reality need, is the arrester which removes surges of high voltage often induced by lightning. The arrester is usually grounded to an underground water pipe and draws off the high voltage harmlessly. Another device, the capacitor, is attached to the electric system near the point of power entrance and protects wiring and electrical appliances within the building. While arresters and capacitors do not prevent all secondary damage through the electrical system, they are quite effective in most cases.

Lightning protection systems are available for any and all types of structures, even trees. Valuable trees can be protected by an inconspicuous rod and cable which "grows" with the tree. Such protection on a lone tree in a pasture, where livestock gather on hot summer days, may be good insurance. An approved lightning protection system may bring a reduction in insurance rates for your buildings, although this varies from state to state. Some states, Ohio and Pennsylvania among them, give no credit for the installation on either farm buildings or other structures. All of the New England states, New York, and some states in the Midwest give large credits for lightning protection on farm buildings. In Wisconsin this credit amounts to 8 cents on the premium for each $100 of insurance carried on an annual policy, 20 cents on a three-year policy, and 32 cents on a five-year policy where the installation bears the Underwriters' Laboratories Master Label. In Texas, similar credits are given on farm buildings.

The price of an approved lightning rod system varies greatly because each system must be tailored to the individual building and skilled labor is required for installation.

As an example of costs, and a basis of estimating your own job, let us take a look at a recently installed protection system on a Midwest farm home. The house is 44 ft. long, 27 ft. wide and 30 ft. high, partly one story and partly two story. Two rods were placed on the chimney, one in the center of the two-story part, one at the gable, and one on the gable of the one-story portion. There are three grounds, and the water system, the electric system, and the heating system were tied in. The job passed inspection for the Underwriters' label. The cost, complete, was $210.

Unfortunately, the industry is still plagued somewhat by irresponsible operators. A representative of an old-line company recently offered this advice: "First, get a firm contract for the system you wish to install. When the work is finished, pay half the bill; then pay the remaining half when the system is inspected and receives the Underwriters' Laboratories label."

Editor's Note: For those interested in more details about lightning rods, a good source of information is the Lightning Protection Institute, 53 West Jackson Boulevard, Chicago 4, Illinois. The Institute, an association of lightning-rod manufacturers, answers questions and distributes a free booklet, *Lightning Facts and Figures.*


26% INCREASE IN ONE YEAR WITH BUCKEYE GRASS INCUBATOR

HOLSTEINS

Melvin Wills, owner of a Holstein herd near Middletown, Ohio says of his Buckeye Grass Incubator, "I've operated it continuously for 12 months since April 1958. We sold $1660.00 more milk with the same number of cows than the year before. This represents a 26% increase in money. My veterinarian bill is just about half . . cows are healthier and better producers. 90% of my cows are being settled on the first service. I'll always feed Buckeye grass every day of the year."

HERE'S PROOF

HERE'S PROOF

JERSEYS

Edgar Smoot, large Jersey Breeder in Utah says, "Since feeding my cows green grass from the Buckeye Grass Incubator, I find almost every one of them on DHIA Reports producing more butterfat. Their condition is excellent. I can see a big difference even in the calves that are getting green feed. The Buckeye Grass Incubator is proving one of the best investments in our operation."

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PROTECTION

FOR FARM BUILDINGS

Lightning never has destroyed any building fully protected by Security System. Protects against new dangers from metal piping, air ducts, etc. Low points, almost invisible. Most durable materials used, all UL approved.

Green Guard Capacitor holds lightning surges to less than line voltage. Prevents damage to water heaters, ranges, lamps, motors. Approved by Underwriters Laboratories, Inc. Nothing to arc or burn. Guaranteed five years.

FOR ELECTRICAL APPLIANCES

Send for full story of 2-way protection.
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SECURITY

*Lightning Protection in the Modern Manner*

# Brillion

**BUILDS THE BEST**

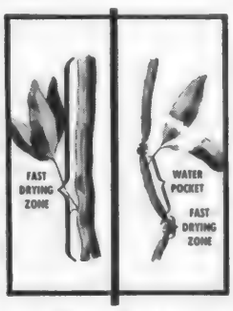
# HAY CONDITIONER

**Get every one of these**

**features on your hay conditioner—**

***Only Brillion has them all***

- Fastest drying, by college test. Because stems are opened for evaporation their full length, instead of only in spots.
- Saves leaves. No tearing, clipping, lacerating. Brillion-conditioned hay carries its leaves to the barn.
- All four drums power driven. Non-powered reels on ordinary hay conditioners rip tender leaves, tear and clip heads.




Why Brillion-conditioned hay, left, dries faster, carries its leaves to the barn. Stem is opened for evaporation along entire length. Leaves are firmly attached, undisturbed.

Contrast with crimped hay, right, which is only pinched intermittently, leaving water pockets between each pinch. Too, crimper's tearing action strips off leaves, chops many stems—causes field losses by dropping high-protein cow feed down into stubble.

- Special guide roller. Power-feeds hay directly into crushing rollers.
- Fluffer. Leaves conditioned hay standing tall in the swath. Cuts drying time.
- Sealed-for-life bearings. Only 3 places to grease on the whole machine!
- Big 15-inch tires. Ride easily, smoothly over rough fields. Timken roller bearings.
- Heavy-duty roller chain drive. No belts to stretch or slip.
- Choose your own drum style. Smooth or slotted, to match your own crop conditions.
- Bigger drums. Large diameter drums open stems gently, without clipping off tender tip and leaves.
- Side-mounted wheels. Run clear of conditioned hay. Prevent digging into high spots.
- Light draft. Any one-plow tractor with standard PTO can pull the well-engineered Brillion.
- One-man hookup. The Brillion is balanced, light on the drawbar.
- Brillion-built for long life. Crafted by Brillion's own skilled engineers, foundrymen, machinists.

**IF BRILLION MAKES IT . . . IT MUST BE GOOD!**

CLIP and MAIL ☐ Write your name and address on the margin.

**Brillion Iron Works, Inc., Brillion, Wisconsin, Dept. HC-3-6**
Please send me information on the Brillion implements I've checked:

☐ Hay Conditioners ☐ Rotary Shredders ☐ Rotary Hoes
☐ Pulverizers ☐ Pulvi-Mulchers ☐ Sure-Stand Seeders
☐ Silo Unloaders ☐ I am a student


## THEY CAN'T BLOCK YOU OFF

(*Continued from page* 53)

(3) Again, keep in touch with your county officials. Point out to them how this improvement is going to affect you and your property. Ask them to show the necessity for this action.

(4) Remember that though control of access is essential on modern highways, you still have the right to compensation for whatever injury such control may inflict on your property rights.

(5) Do not sign any agreements or accept any offers without a thorough understanding of every item they contain. Carelessness could cost you thousands of dollars.

(6) If you do not understand these documents do not hesitate to consult your attorney.

(7) If negotiation with the right-of-way representatives fails to produce what you feel is a fair settlement, court action may be the next step. Give your case to a good trial lawyer whose judgment you trust and let him take it from there.

(8) You will also need appraisers to establish the value of your property if you go to court. Be sure they are well qualified and acquainted with values in your vicinity.

### Alternatives

Limitation of access does not mean that the abutting or nearby property owner is necessarily going to suffer great damage. Like everyone else he will be able to enter the limited access highway only at certain designated intersections. But, ordinarily, he will seldom need to travel that road, anyhow. His primary concern is getting across it.

The map on pages 52 and 53 is a good example of the various means the highway department can provide to keep the new road from disrupting the cross-flow of traffic.

If a piece of land is cut off entirely from access the state must compensate the owner for the value of the piece. In some cases exchanges can be worked out between neighboring owners. For example, a new road may leave one owner with his buildings on the west of the right-of-way and most of his land on the east; his neighbor may find himself with his buildings on the east and most of his land on the west. Skillful negotiators may be able to work out an exchange which will enable each to consolidate his operations on his own side of the highway.

In Montana, where farms and ranches are huge, the highway department is using concrete box underpass structures 12 feet high by 16 feet wide to provide passage from one side of the highway to the other. Locked gates, the key being in the possession of a local officer of the highway department, are another solution to the problem of the infrequent migration of farm equipment from one side of the road to the other. The Bureau of Public Roads takes a dim view of this, however.

Suggestions have been made by those experienced with the problem for improving the negotiation proceedings.

Bob Ety, for example, who missed completely the hearings which preceded the control of access in his case asks why the state could not notify personally each landowner or resident to be affected. He feels many either fail to see the newspaper ads or fail to realize that the advertised project will affect them.

It has also been pointed out that legal descriptions and highway design blueprints are unfamiliar and confusing to most laymen, making it hard for them to visualize how the highway will really affect them. Aids in visualizing the completed highway would be of great help to both owners and appraisers.

A bill is now pending in the Ohio Legislature to give the Director of Highways in that state more authority in the closing of county and township roads. And all over the country right-of-way procedures are being streamlined and refined.

It is not at all unlikely that someday you, too, will tangle with this problem. If it hits you, you will do well to heed the advice of one who has been through the mill. "Don't be greedy," he says. "Remember, you can't block progress; but you don't have to give away your property or your rights and the courts will sustain you in their defense."

THE AUTHOR: Charles Straub is a freelance writer and frequent contributor to THE FARM QUARTERLY.

## GRAIN IN THE BANK

(*Continued from page* 41)

and sends him at the end of the month a copy of the grain bank statement. This statement shows how much corn or oats was originally delivered to the elevator; how much was moved out on any date; how much moved through the mill; and what the balance is. This balance may frequently, particularly toward the end of the feeding season, be "in the red"; meaning that the customer has used all his own grains and is now buying from the elevator. He can cover this indebtedness either by the delivery of more grain or by cash.

There have been some operators—definitely not at Monticello or at Rardin's—who have said one of the chief inducements to the elevator is to have the farmers "in the red" when grain is scarce and the price is high. Then collect.

There are few written contracts in connection with the banking operation. Some farmers, however, have been heeding the warning of Dr. Robert Suter of the Agricultural Economics Department, Purdue University, to contract ahead on their supplements as a protection against getting caught with no opportunity to bargain on price. Where no charge is made for storage, the price of supplement, he notes, is sometimes increased to offset this cost.

The grain bank and bulk feeding seem to be perfect complements to each other. Though at present the greatest part of the feed going back to the farms is bagged, bulk handling is rapidly taking over. The self-augering truck which takes the feed from the mill to the self-feeder on the farm will soon be the almost universal delivery conveyance.

Everett Glasgow, one of the directors of the Monticello Grain Company, has been one of the longest and most constant users of the grain bank. His interest in it, however, is other than the storage of home-produced grain. He has stayed within his allotments on his 640 acres, and he seals all his corn, buying "free" corn at harvest time. This purchased corn goes into the grain bank. He has usually made 25 cents a bushel or more on this deal. On big lots such a spread adds up to a tidy profit. Under the new corn price support arrangements, this feature may lose much of its attractiveness.

The economic advantages of the grain bank to the farmer are not hard to fathom. First, he saves the cost of construction and maintenance of on-the-farm storage facilities. Some professional farm managers estimate these charges as high as 20 cents a bushel. But even if they could be cut to almost nothing as some claim can be done by a combination of low-cost construction and rapid tax write-offs, there is still the risk of spoilage or destruction of the grain.

Also, by using the grain bank the farmer eliminates the need for his own hammer- or roller-mill and for a dryer; and with more and more elevators installing pelleting equipment he puts himself in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If you are to keep profits coming from your agriculture, you'll have to stay a jump ahead of swiftly changing agribusiness. Seeds and fertilizers are changing. New tools of production are being developed. There are changes in the ways livestock is marketed.

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Weight 130 lbs. Electrically driven spit extra.

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- Fiberglass Troughs—Won't rust . . . EVER.
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COVERALL is water-proof, rot-proof, acid-proof. Meets FHA specifications. Durable, inexpensive. The Best Polyethylene Sheeting Money Can Buy. Made by Warp Bros., Chicago 51, Ill.—Estab. 1924. Originators and Largest Producers of Plastic Sheeting for Farm Use.

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| 2 Gauge (.002) . . . . . 1¢ Sq. Ft. | 3', 4', 9' & 16 ft. widths |
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Raises With Only 10 Pounds Lift. $95

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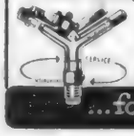

The Skinner Irrigation Co.
200 Water St., Troy, Ohio

...for over a half century


position to take advantage of this latest feeding improvement.

With self-augering trucks becoming almost as common as the old pick-up, a feeder can easily convert to a push-button operation once he hooks up with the grain bank. And the simple fact that he can call the elevator, order a batch of feed mixed to specification, and arrange to have it delivered or pick it up at an appointed hour is a tremendous convenience as well as a time-saver. As Noble Lowery says, "I used to fool around loading up a truckload of corn, take it to the mill and sometimes wait in line for hours to get it ground. Now I just call up, and tell them how much I want of my mix and they schedule me in without any waiting."

The possibility of sealing one's own crop and buying cheap corn for feeding is another most attractive advantage (though, as pointed out, the attraction may vanish with changes in the government's support program).

And the extended credit facilities the grain banks offer are a defense against integration. The farmer reduces to some extent his working capital requirements and in effect cashes in on the advantages of bulk storage facilities.

The points the farmer must guard against are getting himself into a spot where he owes grain to the bank when the price is high; restricting his bargaining power in buying supplements; and getting back


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SCIENTIFICALLY!

Test Your Own Grain
In The Field

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AS LOW AS
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Tells best time to harvest each field and each load. Avoid penalties for grain too wet or too dry. Save trips to town for testing. A Radson "tunes-in" exact moisture % on easy-to-read dial. Thousands in use. Unconditionally guaranteed. See your dealer or write—

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Unfailing in years of everyday use.
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grain of poorer quality than he delivered.

The feed mills and elevator operators like it, too. From their viewpoint the big drawback is that it ties up their storage facilities. Some of the smaller operators put a ceiling on the amount of grain they will hold for any farmer.

But they like the intimate relationship it produces with their farmer-customers. When they hold a man's grain they are pretty sure they are going to continue to sell him feed and provide him with other services. Competition is going to have a hard time stealing him away.

Those who have had experience with the grain bank offer these suggestions:

Give the best service and the best price possible to the customer.

Keep complete and accurate records and install the most accurate accounting system available.

Keep a watchful eye on shrinkage and make processing charges and feed margins adequate to compensate for the services offered.

Don't let a man store more grain than he will eventually use for feed. If he does, charge storage on the excess.

With prudent management and responsible action on the part of both farmers and elevator men the grain bank promises to be a valuable tool for every independent livestock feeder.

## GRAIN MOISTURE IS MONEY

(*Continued from page 74*)

On 1000 bushels of soybeans combined at 10 per cent moisture your loss, besides the excessive shatter at the cutterbar, would be 39 bushels (1000 minus 961—Table 1, column 4). At $1.90 per bushel this comes to $74.10.

Field studies conducted by the agricultural engineering department of Ohio State University show that at 18 per cent moisture there is a cutterbar shatter loss of about 20 pounds of soybeans per acre. At 10 per cent moisture the loss jumps to about 140 pounds per acre.

### Hauling Water

Table 2 (page 122) indicates the amount of water which must be removed from corn, soybeans and wheat of various moisture contents to reduce them to standard quality. These figures balanced against your estimated or known costs of removing a pound of water can be a big help in deciding at what moisture content to begin harvesting. At higher levels the sun and wind may be your most efficient tools.

Picking ear corn at 28 per cent moisture involves hauling an additional 18.8 pounds of water from the field for every bushel picked. All of this additional weight, of course, is in water which must eventually be removed before the corn is of No. 2 grade at 15.5 per cent moisture. Every

13 YEARS OF
UNINTERRUPTED SERVICE!

. . . McDowell Irrigation Couplings prove sound investment on Pennsylvania farm

Says Paul Sereda, Allison Park, Pa. —
"I feel that every dollar I invested in McDowell Couplings and Fittings has repaid me well after 13 years . . . no service interruptions or difficulty whatever due to failure of any McDowell part."

Divide the dollars by the years and the best becomes the least expensive

From your original investment and for their entire long life you can be ahead with high-quality McDowell Portable Irrigation Couplings.

*The original automatic pressure lock*—just insert tube end into coupling for a leak-proof joint. Water pressure does the rest. Release water pressure to withdraw tube end.

*No tools*—no threads, no clamps, no latches.

*Salvageable* from old to new pipe.

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Let McDowell distributors with their experienced irrigation engineers plan the right system for your farm.

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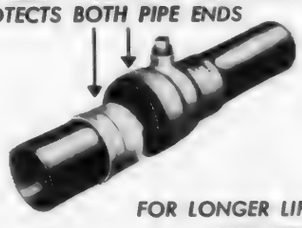

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"Big-Level" features at a budget price—only $59.95*

With 8 ft. builder's rod—$67.45

It's new, handsome and low in price. It's especially designed to solve every leveling problem around the farm. And look at this line-up of features! A 10-power optical system with 11½" internal focusing telescope. Built-in sunshade. Precision ground vial located under the telescope for greater protection against breakage and the sun's rays. Horizontal circle graduated to single degrees. 4-screw leveling head fully enclosed for dust protection. This rugged construction means years of trouble-free service.

Use it for contour farming, determining lines and grades, snow fences, straight crop rows and anything that needs "leveling up." And for erecting farm buildings and for many other day-to-day jobs.

Put your eye to the "Speed-A-Liner" Dumpy Level. See how accurately it performs. How easy it is to level up. You'll be surprised that such a fine instrument could be priced so low. Typical of the superior quality Berger has put into its instruments since 1871.

**ALSO NEW.** "SPEED-A-LINER" BUILDERS' TRANSIT-LEVEL 13 power optical system, lever type lock, many new features, only $99.75*

*Price includes stiff leg tripod, carrying case, accessories and instruction manual.

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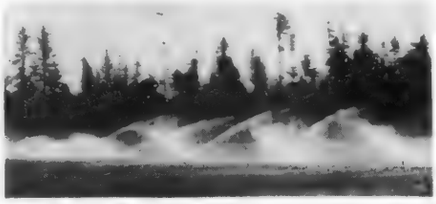

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Rain Bird No. 30-TNT

When you want more efficient sprinkling with lower maintenance—use Rain Bird. Patented spoon-type arm and slow rotation means even water distribution and absorption. Simple design—fewest moving parts. The rugged "bridge" top, a Rain Bird exclusive, provides balanced 2-point drive for minimum wear. Over 21 models to choose from. For areas with air or waterborne sand or silt—specify TNT bearings, a significant new Rain Bird development. *See your local Rain Bird dealer soon, or write for literature.*

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54 East Cordova Street, Vancouver 4, B.C., Canada


bushel of shelled corn harvested at 30 per cent moisture contains an extra 11.6 pounds of water.

Table 1
VALUE EQUIVALENT OF GRAIN BASED ON MARKET STANDARDS

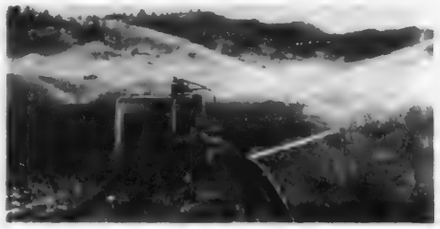
| Moisture Content % | Ear Corn | Shelled Corn | Soybeans | Wheat |
|---|---|---|---|---|
| 10 | 0.929 | 0.939 | 0.961 | 0.956 |
| 12 | 0.953 | 0.960 | 0.983 | 0.978 |
| 13.5 | —— | —— | 1.00 | —— |
| 14 | 0.979 | 0.983 | 0.994 | 1.00 |
| 15.5 | 1.00 | 1.00 | —— | —— |
| 16 | 0.992 | 0.994 | 0.971 | 0.977 |
| 18 | 0.957 | 0.970 | 0.948 | 0.954 |
| 20 | 0.917 | 0.947 | 0.925 | 0.931 |
| 22 | 0.879 | 0.923 | 0.902 | 0.902 |
| 24 | 0.846 | 0.899 | | |
| 26 | 0.815 | 0.876 | | |
| 28 | 0.788 | 0.852 | | |
| 30 | 0.763 | 0.828 | | |
| 32 | 0.740 | 0.805 | | |
| 34 | 0.718 | 0.781 | | |

Table 2
POUNDS OF WATER WHICH MUST BE REMOVED TO REDUCE THE MOISTURE CONTENT OF ONE BUSHEL OF GRAIN TO MARKET STANDARD

| Original Moisture Content % | Ear Corn | Shelled Corn | Soybeans | Wheat |
|---|---|---|---|---|
| 14 | —— | —— | 0.3 | —— |
| 16 | 0.6 | 0.3 | 1.6 | 1.4 |
| 18 | 3.2 | 1.7 | 3.0 | 2.9 |
| 20 | 6.4 | 3.2 | 4.5 | 4.5 |
| 22 | 9.7 | 4.7 | 6.1 | 6.2 |
| 24 | 12.7 | 6.3 | | |
| 26 | 15 9 | 8 0 | | |
| 28 | 18.8 | 9.7 | | |
| 30 | 21.8 | 11.6 | | |
| 32 | 24.6 | 13.6 | | |
| 34 | 27.4 | 15.7 | | |


THE AUTHOR: Kenneth A. Harkness, an instructor in agricultural engineering at The Ohio State University, is also engaged in research in the harvesting and treatment of small grains, soybeans and corn.

# CMC RAINMASTER IRRIGATION PUMPS



**the sure way to biggest yields at lowest cost**

Water or air-cooled engine models . . . gasoline or diesel power

Power-take-off units

Why gamble when you can play it safe? Be *sure* of maximum yields from each acre by applying moisture when it's needed most with dependable **CMC RAINMASTER IRRIGATION PUMPS.**

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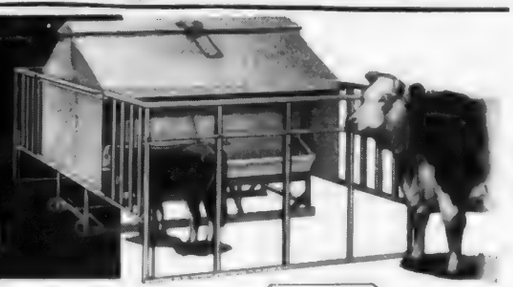

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NOW AVAILABLE IN 2 SIZES! Double stall creep feeder (above) holds 30 bushels, takes care of 40 calves; single stall creep feeder (below) holds 12 bushels, takes care of 20 calves.

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**BROWER MFG. CO., Box 5123, Quincy, Illinois**

## PUMP-PLANT TEST

(*Continued from page* 49)

power unit must overcome inefficiencies in the pump and drive, as well as lift water.

"The pump must fit the well," said Paul E. Schleusener, slender, grayhaired professor at the University of Nebraska. "Buying a pump and power unit before the actual construction of the well is like buying the furnace for your home before you have planned the number of rooms in the house. We had a fellow in here not long ago who had actually bought the pump, and not even a test hole had been drilled. He was worried because it was a five stage turbine, and his neighbor had a three stage turbine." Schleusener looked up through black-topped glassed, "This is the sort of thing that leads to gross inefficiency."

### The Testing Instruments

*Water Level:* Several electric devices show by light, bell, or meter when the water is reached. A cable is lowered in the well, and when the end touches water an electrical connection is made. Such a device is the Fisher M-Scope water level indicator, costing $52.50.

An airline depth gauge may be permanently installed with the pump. This is an air-tight tube, which runs down inside the well casing. A pressure gauge indicates the depth of water in the well after pumped air has forced the water out of the tube.

*Whatever method is used, the depth of water must be measured with the pump operating, and after the water level has stabilized.* It is very easy when the pump is running, to have a line or tape sucked up if it is lowered too near the water inlet. This may damage the impellers seriously.

*Pressure:* In some cases, when the water has reached the surface, the pump's job is over. The water then flows by gravity down ditch or into pond. But with piped irrigation, the pump has more work to do.

This pressure, or lift, above the surface can be measured with a pressure gauge. It can also be calculated. There are tables to give the pressure needed by sprinkler heads, and to find the pressure required to overcome losses in standard pipes, on corners, on gated pipes and for extra height. Pounds pressure times 2.31 converts the pressure to lift in feet.

*Fuel consumption:* "The best way to measure this is weight," said D. D. Axthelm, quiet, bespectacled irrigationist of the University of Nebraska, who performed most of their tests." But since weighing requires special attachments, most farmers will use volume checks—over a longer period. These are subject to error, as most pumps are not run at constant speeds for long periods, and pumping level and discharge may not have stabilized. Lastly, fuel temperature affects its volume."

Common fuel weights are:

| | |
|---|---|
| Tractor fuel | 6.75 lbs./gal. |
| Gasoline | 6.15 " " |
| Diesel fuel | 7.05 " " |
| Propane | 4.23 " " |

*Pump Speed:* This is measured with a tachometer. A typical one, the Stewart Warner hand model, costs $13.50 and will measure shaft speeds up to 4,000 rpm.

*Yield:* Water discharge can be measured by several methods. For closed pipe systems, water flow meters are usually used. Ditch irrigators can also use weirs, flumes, or orifice plates.

Weirs and flumes are openings of measured size in a channel. The depth of water indicates the flow. A weir may be box or


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GASOLINE—IRRIGATION

| Model | Cyl. | Bore | Stroke | Bare Engine H.P. |
|---|---|---|---|---|
| Y-112 | 4 | 3 7/16 | 3½ | 33.0 @ 2800 RPM |
| F162 | 4 | 3 7/16 | 4⅜ | 52.0 @ 2800 RPM |
| F226 | 6 | 3 7/16 | 4⅜ | 77.0 @ 2800 RPM |
| F244 | 6 | 3 7/16 | 4⅜ | 85.5 @ 2800 RPM |
| M330 | 6 | 4 | 4½ | 109.0 @ 2800 RPM |
| M363 | 6 | 4 | 4 13/16 | 129.0 @ 2800 RPM |
| B427 | 6 | 4 1/16 | 4⅜ | 131.9 @ 2800 RPM |
| H260 | 4 | 3⅞ | 5½ | 64.0 @ 2200 RPM |
| H277 | 4 | 4 | 5½ | 68.4 @ 2200 RPM |
| J382 | 4 | 4½ | 6 | 81.0 @ 1600 RPM |
| T427 | 6 | 4 9/16 | 4⅜ | 151.0 @ 2800 RPM |
| U501 | 6 | 4½ | 5¼ | 163.0 @ 2600 RPM |
| R602 | 6 | 4⅜ | 5½ | 195.0 @ 2600 RPM |
| S820 | 6 | 5⅛ | 5½ | 260.0 @ 2600 RPM |

LPG—IRRIGATION

| Model | Cyl. | Bore | Stroke | Bare Engine H.P. |
|---|---|---|---|---|
| F162 | 4 | 3 7/16 | 4½ | 53.0 @ 2600 RPM |
| F226 | 6 | 3 9/16 | 4½ | 76.0 @ 2600 RPM |
| F244 | 6 | 3 7/16 | 4⅜ | 87.0 @ 2600 RPM |
| M330 | 6 | 4 | 4½ | 117.3 @ 2600 RPM |
| M363 | 6 | 4 | 4 13/16 | 133.0 @ 2600 RPM |
| B427 | 6 | 4 1/16 | 4⅜ | 131.0 @ 2600 RPM |
| H260 | 4 | 3⅞ | 5½ | 63.0 @ 1800 RPM |
| H277 | 4 | 4 | 5½ | 72.5 @ 2200 RPM |
| J382 | 4 | 4½ | 6 | 90.0 @ 1800 RPM |
| K363 | 6 | 4 | 4 13/16 | 132.0 @ 2600 RPM |
| T427 | 6 | 4 9/16 | 4⅜ | 148.0 @ 2400 RPM |
| U501 | 6 | 4½ | 5¼ | 176.0 @ 2600 RPM |
| R602 | 6 | 4⅜ | 5½ | 216.5 @ 2400 RPM |
| S820 | 6 | 5⅛ | 5½ | 280.0 @ 2600 RPM |

DIESEL—IRRIGATION

| Model | Cyl. | Bore | Stroke | Bare Engine H.P. |
|---|---|---|---|---|
| ZD129 | 4 | 3¼ | 3⅞ | 34.0 @ 2000 RPM |
| GD157 | 4 | 3½ | 4½ | 39.0 @ 2000 RPM |
| ED201 | 4 | 3½ | 4⅞ | 45.8 @ 2000 RPM |
| HD260 | 4 | 3⅞ | 5½ | 74.0 @ 2400 RPM |
| HD277 | 4 | 4 | 5½ | 79.0 @ 2400 RPM |
| JD382 | 4 | 4½ | 6 | 87.4 @ 2000 RPM |
| TD427 | 6 | 4 9/16 | 5½ | 132.0 @ 2200 RPM |
| RD572 | 6 | 4¾ | 5½ | 154.0 @ 2000 RPM |
| SD802 | 6 | 5 9/16 | 5½ | 202.0 @ 1800 RPM |

Numerals in model designations denote piston displacement in cubic inches.

•

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V-shaped. A flume looks like an hourglass, having a narrow waist through which the water has to pass. Again, depth of water shows the flow. Flumes and weirs *must* be level to be accurate.

An orifice plate is a carefully machined hole, smaller than the regular pipe, fitted to the discharge. A vertical graduated tube is attached to the discharge pipe in front of the orifice plate. It is graduated in gpm. Pressure caused by the orifice plate's smaller hole pushes water up this side tube to indicate water flow.

A sprinkler irrigation system has a built-in method of measuring yield. Manufacturers' tables show the output of sprinklers at various pressures. These are very accurate with new sprinkler heads, but will alter when the orifice is old and worn.

A water flow meter may be inserted in the pipe. A propeller—like a boat propeller—spins as the water passes and the volume is shown on a dial. One meter, the Sparling low pressure line meter-head, registers from 120 to 1200 gpm, and costs $230 to fit on 8-inch pipe. ($190 for 6-inch pipe). Sizes go from 4-inch to 72-inch pipe.

(An excellent book is "Measuring Irrigation Water," Circular 473, California Agricultural Experiment Station Extension Service).

### After the Test

Take Dale Lingenfelter again. In the test, the total lift was 120 feet, pump rpm 1770, and yield 690 gpm. Using the formu-


**BE COMPLETELY SATISFIED WITH YOUR IRRIGATION PROGRAM . . .**

**Insist on HALE "MATCHED POWER" Irrigation Pumping Units**

In order to realize the greatest benefit from your irrigation program, you've got to have the right equipment plus economy of performance, dependability and low maintenance costs. That's exactly what you get when you choose the pump you need from Hale's complete line of "matched power" irrigation pumping units.

You get Economy of Performance . . . because every Hale Irrigation Pump is *designed to match the power of its engine.* This means you get all the OUTPUT you pay for—even under the toughest types of working conditions.

You get Dependability . . . because the Hale name stands for dependability—backed by more than 40 years in the manufacture of quality pumps.

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**Hale Type PIR**

(Trailer or Skid Mounted) Here's a pump that will give you more work at less cost . . . extra gallonage, and longer trouble-free service, too. Pumps 500 GPM at 120 PSI; 850 GPM at 75 PSI.

For the bigger jobs you'll find the Hale Type CIRV (trailer or skid mounted) to be the finest piece of equipment, the smartest investment you've ever made. Pumps 1500 GPM at 75 PSI; 1000 GPM at 130 PSI.

**Hale has a complete line with capacities from 120 to 1600 GPM INCLUDING THESE 3 FAMOUS UNITS:**

**Hale Model 20-T "Torrent"**

Tops for "on-the-spot" filling of tanks with water, liquid fertilizer, etc.; for small irrigation jobs; for stand-by water systems; and for emergency fire fighting. Pumps 7000 U.S. gallons per hour. Also, the Hale Model 30-T pumps 20,000 G.P.H. at free flow discharge, with ample reserve.

**Hale "Tractor-Mate"**

A pump specifically designed for farmers, orchardmen and market gardeners who want low cost irrigation for medium acreage. The "Tractor-Mate" offers a wide range of volume and pressure—it is compact, efficient and economical to operate. It can also be used as a booster unit for systems already installed.

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Irrigation Division

HALE FIRE PUMP CO. CONSHOHOCKEN, PA.

*Giant, Portable*

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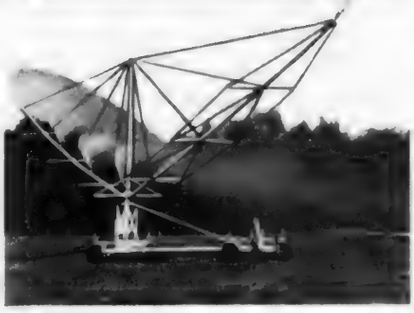

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**Covers Large Area At A Low Controlled Precipitation Rate**

Here's the ORIGINAL giant portable sprinkler for fast, low-cost, labor-saving irrigation. Tested for years — no other sprinkler can offer such a carefully controlled and accurate precipitation application. Pow-R-Sprinkler resembles a giant lawn sprinkler on wheels. Rotates by water pressure only. Saves back-breaking pipe moving, labor and time. Pulled by any farm tractor. Ideal system for row crop or pasture.

**COVERS 2½ TO 5 ACRES PER HOUR WITH DESIRED AMOUNT OF "RAIN"**

Air photo at left shows Vermeer Pow-R-Sprinkler in action. The big nozzle covers outer part of circle, and small nozzles the inner area. Note tremendous coverage.

**POW-R-SPRINKLER TRAILER ALSO USED AS PIPE CARRIER**

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la, the water horsepower was $\frac{120 \times 690}{3960}$ or 20.9 whp.

His diesel fuel consumption was 2.06 gallons per hour. To calculate the whp-hours per gallon:

$$\frac{\text{whp}}{\text{gallons fuel per hour}}$$

or $\frac{20.9}{2.06}$=10.15 whp-hours per gallon.

From the Standard we see diesel fuel will deliver 11.06 whp-hours per gallon. The performance rating is:

$$\frac{\text{whp-hours per gal. (field calculation)} \times 100}{\text{whp-hours per gal. (Standard)}}$$

or $\frac{10.15 \times 100}{11.06}$=91.7.

This was already a high rating unit—but a small adjustment to the pump was made, and a new test figure showed: lift 128.5 feet, pump rpm 1780, gpm 950. Thus the whp was $\frac{128.5 \times 950}{3960}$ or 30.8.

The unit was now using 2.64 gallons fuel per hour. Thus he obtained $\frac{30.8}{2.64}$ or 11.8 whp-hours per gallon. The standard for diesel fuel is 11.06 whp-hours per gallon. Therefore $\frac{11.8 \times 100}{11.06}$=105.3 or 5 points better than standard. The difference in water depth is caused by the increased drawdown in the well when more water is being removed. The pump rpm show it was not pump speed that made the difference.

### What Does the Test Show?

How could a pumping plant be 105 on the scale, or 5 over the standard? This is because the University of Nebraska standard is based on an average overall efficiency. The pump itself is considered 75 per cent efficient, a 5 per cent loss is allowed for the drive, and the fuel figures are averages for engines. An electric motor is rated 88 per cent efficient.

Now, the actual efficiency of a unit is the efficiency with which it converts energy (in any form) into work done—water lifted in this case. The University has taken the several energy losses, and subtracted them from the original energy to make the standard an average. The standard will correspond to an overall efficiency of very roughly 70 per cent. Now it is possible to get higher than 70 per cent overall efficiency—so the 100 mark on the University of Nebraska scale can be passed, as Dale Lingenfelter passed it. Some large pump units are very efficient. The pumping units in the Grand Coulee Dam have an overall efficiency of over 90 per cent, but they pump 720,000 gpm. Small garden pumps may have low overall efficiency, between 40 and 60 per cent.

The Nebraska test was designed for Nebraska conditions, and for deep well turbine pumps. But the measurements taken are the same whatever final scale is used, and qualified men can judge performance from either.

What can cause the low performance,


# BIG PROFIT STORY

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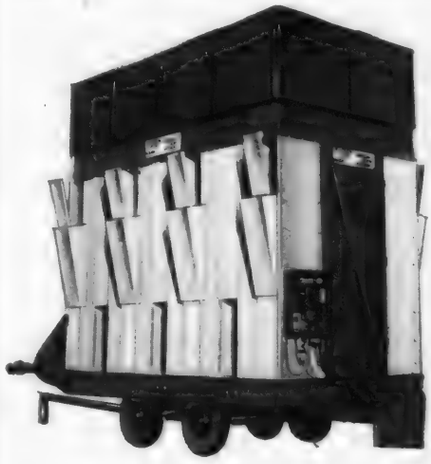
**This is the "BIG STORY" of the NEW MODEL 500 MC GRAIN DRYER**

No stop and start waiting for batches — you don't waste time or money with the M-C Continuous Flow GRAIN DRYER. WET GRAIN IN THE HOPPER . . . DRY COOLED GRAIN FROM THE M-C FLOWING AUTOMATICALLY.



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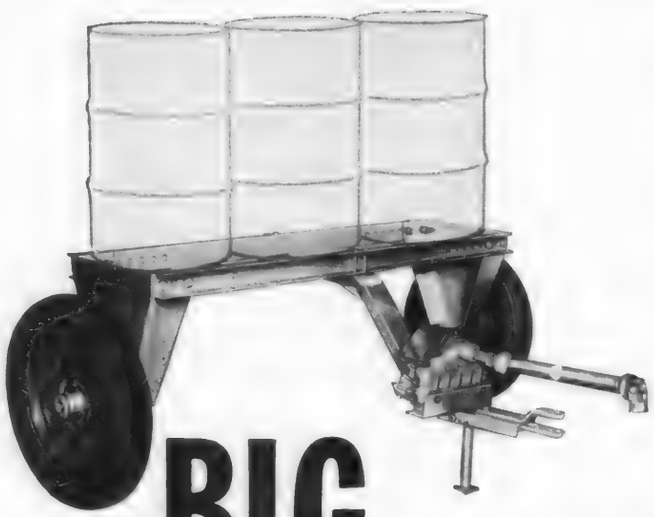

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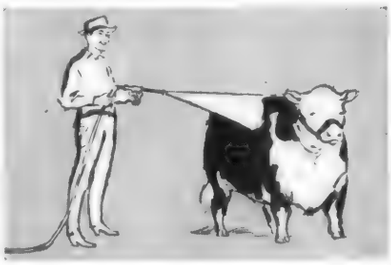
Versatile and rugged too. Pump has ni-resist cylinder shells, stainless steel valves, built-in vacuum and air chambers. Handles all types of spray solutions. Develops 300 pounds pressure at 6 gallons a minute.

Here's plenty of pressure for cattle spraying. Spray trees, shrubs, brush, apply disinfectants in chicken coops, barns. Use on any high pressure job. Gun nozzle is adjustable for spraying a broad, fine mist or a narrow, hard stream.



The Myers Trailer Sprayer can be used with a wide range of booms for low cost weed control and crop protection. Easily adaptable for boomless spraying. Trailer has 30 inch clearance and adjustable tread for wide range of row spacing.

**Myers**

*For complete details on the Myers Trailer Sprayer, see your Myers Dealer—or write to:*

**The F. E. Myers & Bro. Co.**

ASHLAND, OHIO KITCHENER, ONTARIO

assuming the well is properly constructed? It can be the pump, the drive, or the engine. Or a little of all three.

*Pump:* Fitting the pump to the well is an expert's job. It should be done by an expert.

This ensures an efficient pump initially, but the adjustments later are also a manufacturer's or a dealer's job.

Lloyd B. Kreizinger is irrigation technician for Seward and Butler Counties, Nebraska. His job includes conducting and evaluating the performance test.

"One of the major causes of pump inefficiency in my area," said Kreizinger, "has been the impellers being out of adjustment. The best adjustment has the impeller as close to its seat as possible without actually touching. To attain this 'perfect impeller setting' is a very delicate operation and should be attempted only by a skilled workman. I know of numerous bowls and impellers which have been damaged by unskilled and uninformed workers, and I have practical records to prove that an impeller adjustment made as much as 200 gpm difference in output.

"Besides this we find cracked, broken and pitted impellers. Many pumps in this area operate with the water level dangerously near to the bottom of the bowls. If the pump should 'pump air' this tends to pit the impeller, making it unbalanced and rough. This increases drag and turbulence and promotes inefficiency. Many pumps, or I should say wells, pump some sand. This also may wear the impeller."

*Drive:* Flat belt, V-belt and gear head are about the same when new. It is over the years the damage comes. A flat belt stretches and slips. A V-belt is better, but costs more. The gear head lasts longest, costs most.

"There is another problem," said Professor John Sulek of the Agricultural Engineering Department at the University of Nebraska. "It is the inefficiency caused by operating over or under the rated speed. This is the reason we measure the speed of the pump and the engine. Wrong pulley or gear ratios cause the speed problems. Two things alter belt efficiency: alignment and tension. Either can also cause belts to wear out quickly.

"Lastly, every belt should be shielded to protect it from the weather, and to protect the farmer from the belt. The bottom of the shield is as important as the top."

*Engine:* John Sulek said, "Only one type of engine inefficiency is ignored—the one that isn't apparent. Inefficiency caused by worn parts is apparent and demands immediate attention. A burned valve or a loose bearing must be repaired or a complete power failure will result. But some faulty adjustments can cause excessive fuel or power loss without engine failure.

"Carburetor and ignition adjustments are two of the most abused adjustments found in our test work. These adjustments are important on all engines. They should only be attempted by qualified persons, and checked at least every year to ensure maximum engine efficiency.

"An engine too big for the job is inefficient. An engine working at 25 per cent of its rating will burn from 2 to 3 times as much fuel as one of the correct size.

"Another reason for poor efficiency is over-cooling. Oh, you occasionally run into an overheating problem, but it demands immediate attention. Over-cooling can go on for months and years. An engine is more efficient and will last longer if it runs at the proper temperature. The outlet water temperature should be between 160 and 180 degrees or more depending on the manufacturer's recommendations. The inlet water should be within 15 degrees of the outlet temperature. This means a tremendous amount of warm water must be circulated in the cooling system."

### Testing Organizations

For three years the University of Nebraska has been doing these tests. Now the University is passing the job, schooling groups of farmers and their irrigation associations. Trained technicians do the test for any member—at low cost, usually under $20.

Kreizinger said, "We are frequently asked if performance tests really accomplish anything. I feel we should state very emphatically that performance testing is a great help to all ethical parties engaged in irrigation.

## TWO PROVEN *Taylor* TOOLS TO INCREASE YOUR PROFITS FROM GRASS

# Pasture Dream®

*America's Pioneer Sod Seeder*

Obtain maximum production from your present pastures with this performance-proven sod-seeding tool. Whether you graze, feed green chop, or make silage from your pasture, sod seeding with the Pasture Dream can increase the output of your present acreage . . . even double it, in many cases!

The Pasture Dream will make it possible for you to:

- ★ Plant grain, fertilize, and band seed grass mixture — in one operation.
- ★ Maintain a balanced mixture of grains, legumes, and grasses.
- ★ Place fertilizer in the ground for maximum benefit without destroying the existing valuable pasture land.
- ★ Reseed alfalfa without plowing up that which you already have.
- ★ Introduce new grasses such as clovers, ryegrasses, etc. into your existing pastures for proven performance from your dairy or livestock herd.

### *Pasture Dream* CLIPPER

Taylor offers a complete line of high-quality rotary clippers. Cutting widths are available from 4' to 11'-6". Pasture Dream Clippers are unexcelled for mowing, clipping, cutting, and shredding.

*The same Taylor Quality goes into both the Pasture Dream Sod Seeder and the Pasture Dream Clippers. Both tools are sturdily built to give long service.*

New illustrated booklet, "Better Pastures Through Sod Seeding", is available upon request. Write us for your copy.

FEMA

# *Taylor*

**MACHINE WORKS**

LOUISVILLE, MISSISSIPPI

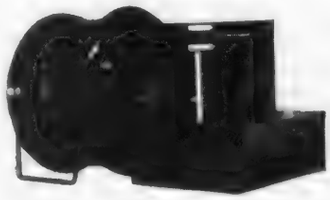
TMW

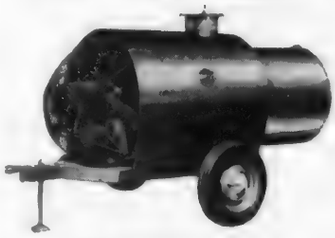

"They give the owner an unbiased and factual record of his well and pump performance, and warn him when his unit is in need of attention. They expose situations like the bowls being near the operating water level. They pin-point pump capacity, and the rpm of the pump and power unit. They give him the fuel consumption of his engine.

"They give the skilled driller public recognition for work well done. They are a deterrent to the shoddy workman. In case of trouble, performance tests help decide which unit—engine or pump, is giving the trouble. Then you know who to call for service. In several actual cases I know of, the owner could not get satisfaction from either the driller or the power unit salesman. In one case, after the test, the owner received a completely reconditioned pump and a new power unit without cost. Prior to the test he had tried for over a year to get someone to listen to his complaints."

The test should be repeated every two or three years. There can be a big change in that time. It wouldn't be fair to say every farmer can save $347 on a year's fuel bill, as one man did. But to judge the need for testing regularly, remember of the 298 wells tested by the University of Nebraska, only 28 were rated above the University's standard.


# You Can Solve Any Crop Curing Problem with Hartzell Drying Equipment





Other famous Hartzell products include controllable and full feathering propellers for light aircraft and a complete line of industrial ventilating equipment.

**Hay, shelled or ear corn, small grain, peanuts, soy beans, tobacco . . . it makes no difference what crop you want to dry, Hartzell has the right equipment for the job.**

**Rain, wind or hail damage to standing crops . . . moisture, mold or insect damage to stored crops . . . Hartzell can help you stop them all.**

**Hartzell's complete line of drying equipment includes portable dryers, batch drying bins and fans for natural air drying. And you can trust your Hartzell representative to recommend the right equipment, because no matter what your job calls for, he can supply it.**

**For complete details on Hartzell drying equipment which can increase the cash value of the crops you sell and the feed value of those you keep, just fill out and mail the coupon below.**

**Hartzell Propeller Fan Co., Dept. F, Agricultural Division, Piqua, Ohio**

Please send me more information on ( ) Hartzell portable crop dryers ( ) Hartzell supplemental heater ( ) Hartzell fans for natural air drying.

I am particularly interested in drying the following crops:_____

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Address_____

City_____ State_____

This Could Happen To You . . .

# Don't take a chance of losing your grade "A" market!

The bulk milk tank you now have, or the one you intend to buy, could be outdated before it reaches a point of profitable return, or is even installed.

New regulations, and their more rigid enforcement, are on the way. One of the most important changes considered is: *You will be required to maintain under a 50 degree blend temperature on second and subsequent milkings*—WITHOUT FREEZING MILK. Are you sure your present cooler, or the one you are considering, can actually do this; and, if so, do it without other objectionable results?

There is one cooler on the market today you can completely depend on for best possible cooling, regardless of new regulations—It's CRAFT! *Craft Bulk Coolers far exceed today's standards, or even the expected future requirements.*

**SECOND COOLING COUNTS**

Craft Bulk Coolers perform a job others can't match. True, there are many coolers that can do the job on the first milking . . . BUT, there are few that can adequately cool milk on second and additional fillings.

Most coolers "spot" cool. In other words, they fail to cover the entire milk tank walls with their coolant. *Craft cools the entire bottom, both sides, and both end walls with a continuous JET-FLOW of 33 degree ice water.*

Craft's unique cooling principle gets your milk down below 40 degrees F. within a few minutes after you finish milking . . . *without fear of churning, freezing, flaking, or development of rancid flavors.* Constantly moist walls retard milkstone buildup. Craft coolers maintain low temperature of milk during the storage period between each milking.

**POOR COOLING CAN COST YOU**

Low blend temperatures become most important when you consider that milk pick-up is rapidly becoming an every-other-day operation. And . . . *milk plant operators can't afford to buy your milk if it has off-flavor or high bacteria count.*

Can you afford not to consider all the facts before making this important purchase? Remember . . . it's your money at stake! You can't get the most out of the advantages of bulk cooling if the cooler you select doesn't meet tomorrow's rigid requirements.

Craft invites your comparison with any other cooler. The folks at Craft believe in the superiority of their product. This belief is backed up by the only written guarantee in the industry.

See Craft and see why it's best!

Find out all the facts about bulk milk cooling. A complete book, titled, "FACTS YOU SHOULD KNOW BEFORE GOING BULK" is available to you FREE! Just send your name and address on a card to:

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There is no obligation! Send for you copy today...it's packed with helpful information!

Craft **MANUFACTURING COMPANY**
2308 DAVIS ST., NORTH CHICAGO, ILL.


## THE PEN—FOR LIFE

(*Continued from page* 72)

Purdue University estimates the cost of permanent buildings for a 24 sow unit at $13,000, excluding sow and boar pens. A farrow-to-finish unit of the same size will cost about $10,000.

The pigs are treated much as in any confined system—two shots of injectible iron, two cc. at three days, and two cc. at three weeks—and all the rations are based on the Nutritional Research Council standards for confined hogs. The sows at present are turned out to grass, but the 24 sow unit has a sow and boar house.

The farrow-to-finish system suffers when small litters and runts are common. A small litter takes the same space as a large one, and practically the same labor. There is no use moving it out, as there is nothing to take its place. However, some farmers may want to move pigs to equalize litter sizes. But a runt is a nuisance, and there is no provision for him. A herdsman has to be good.

Equally, though, the opportunity to save pigs and get good feed efficiency is great. The pens are comfortable, and the hogman has little to do mechanically. Sanitation is good—the litters don't touch each other—and the hogman need not touch the pigs.

There is the problem of timing—to keep hogs in one building all the same age—but to balance this, the pen need be disinfected only once per pig crop. The sow lives much the same as ever—when she leaves the litter (and weaning date is flexible) she can go to pasture or to breeding housing as the herdsman wishes. The weaning date is not a limiting factor to timing—the sow can leave early or late in the pig's life without delaying another sow's entry, as she would in a farrowing crate.

Theoretically, the same sow comes back into the same building and the same pen her previous litter occupied—with weaning at 4 weeks, and 5 months to slaughter. The cycle would repeat every 5½ months, to give a little time to disinfect and reoccupy, giving an 11-month cycle. Building depreciation is estimated at 8 to 10 years.

"It's bound to come," said Don Golay. "The industry has lagged behind others in mechanization. The white meat market has been pressing us, and we have to control the production of pork. This is


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Quality Drying at Low Cost

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a factory, a controlled environment. What has to be emphasized," he continued, "is the controlled ventilation; 40 to 80 degrees is the range of temperature for pigs. In the South they may need the building to insulate *out* the heat. We're bound to have a lot of do-it-yourselfers, but they've got to be very careful—ventilation and manure removal must be controlled."

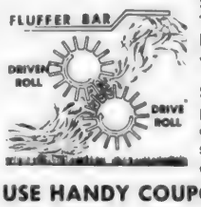
Mass acceptance of this system could be fantastic. Jim Sheldon said one man could handle six 24 sow units! Each of these farrows 48 sows a year; average litter of eight pigs gives 384 pigs a year, selling at 225 pounds per hog makes 86,400 pounds of pork per building. One man will produce 518,400 pounds of pork per year.

Assuming a dressing percentage of 70 per cent, and consumption of 66 pounds of pork per person per year, 180 million people could be supplied with pork by fewer than 35,000 hogmen. Today there are around 200,000 hogmen in Iowa alone.

Hog farming is without any doubt moving to confinement—the tightest type of confinement—broiler-type swine production. Some of the results may take generations to see. We know very little of the quality of an animal born, raised and


**BRADY**
**OUTPERFORMS ALL OTHER HAY CONDITIONERS**

**QUICK DRYING CRIMPING ACTION**




Speeds-up drying. There's less leaf loss and little weather damage.

Seals-in valuable proteins as hay dries faster. Hay stays field green all winter.

**USE HANDY COUPON FOR MORE INFORMATION**

*Please send me more information about the big capacity Brady Hay Conditioner.*

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# NEW

**light-weight... power-packed**

# AIR-COOLED DIESELS

**for economical farm power**

**Jlo* Series 365** **Jlo Series 660**
**7 horsepower** **12 horsepower**
**(pronounced "ee-lo")**

There's a growing demand for the dependability, economy and safety of diesel engine power for farm applications. Now, for the first time, Hercules offers you the benefits of low-cost, maintenance-free, air-cooled diesel power for applications below 15 horsepower.

Look at the features this new Jlo Series line, available only through Hercules nationwide distributor network, offers:

**SIMPLICITY:** Jlo Series diesels are of the 2-cycle design, proved practical in their power range. That means there are no valves, tappets, push-rods or camshaft in Jlo engines to require maintenance or adjustment.

**EASY TO OPERATE:** Jlo Series diesels start fast in all weather; run smoothly too, even under tough, intermittent-load service.

**ECONOMY:** Low initial cost is coupled with lower maintenance costs, due to the Jlo engine's simple, dependable design. And you save on fuel, too.

**PERFORMANCE-PROVED:** These West-German built diesels have been successfully used the world over . . . now are available in the U. S. through Hercules, known for dependability and service.

**LIGHT WEIGHT:** These powerful engines deliver 7 and 12 horsepower yet weigh only 110 and 190 lbs., respectively; add less dead-weight to equipment and save on foundations in stationary applications.

**HERCULES**

**HERCULES ENGINES... Sold and Serviced the World Over**

**SEND FOR A BOOKLET ON THESE COMPLETELY NEW ENGINES!**

**HERE'S WHERE JLO SERIES ENGINES CAN SERVE YOU:**

auxiliary generators . balers combines . corn pickers . conveyors . crop dryers . fans . grain elevators . harvesters . hoists irrigation pumps . silage blowers sprayers . spreaders . swathers tractors... and other farm jobs.

*Reg. TM JLO-Werke, G.m.b.H., Pinneberg, Germany

**Hercules Motor Corporation**
**Department 32F, Canton 2, Ohio**

Yes, I'd like more information on Jlo Series Diesels for this application. . . . . .

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# 20 MILLION TREES a year!

FROM SELECTED SEED

**YOUR IDLE LAND CAN PAY YOU A HANDSOME PROFIT!**

*Plant Christmas trees and timber crops* from Musser stock. *It Pays* to get healthy trees from selected seed. There is as much difference in seed as in common and purebred livestock. *Musser Trees Grow and Thrive* because of Good Heredity, Careful Selection of Seed and Scientific Culture. Don't waste time and money on inferior stock.

***SEEDLINGS and TRANSPLANTS at LOW, QUANTITY PRICE — such as:—***

**SPECIAL STRAIN SCOTCH PINE** per 1000
Very best Christmas tree strain. From seed collected by our men from selected parent trees. Healthy, sturdy, straight stemmed, rich color.
2-yr. Seedlings, 3 to 6 in. . . . . $ 25.00
2-yr. Seedlings, 4 to 8 in. . . . . 30.00
4-yr. Transplants, 8 to 12 in. . 100.00

**NORWAY SPRUCE—fast growing** per 1000
Seed collected by our men from selected trees.
2-yr. Seedlings, 5 to 10 in. . . . $ 35.00
4-yr. Transplants, 10 to 12 in. 100.00

**BLUE SPRUCE Superior Stock**
3-yr. Seedlings, 4 to 8 in. . . . . $ 45.00
3-yr. Seedlings, 6 to 10 in. . . . 60.00

***Free Catalog*** *complete with wholesale planting list. Ask for our famous Christmas Tree Growers Guide.*

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Self-propelled 3-wire or twine baler, made by J. A. Freeman & Son, Portland, Ore. Two model VH4 30-hp Wisconsin Engines are used to provide variable ground speed and selective speed for the baler . . . with ample additional power to pull wagons or sleds and give good traction on hilly ground.

*save manpower . . .*
*save work hours*
with
**WISCONSIN-POWERED**
**Self-Propelled Equipment**

Massey-Ferguson No. 20 self-propelled swather, made by Massey-Ferguson, Ltd., Toronto, Ont., Canada. This highly maneuverable machine is powered by a Model V-4 30-hp Wisconsin 4-cylinder V-type Engine.

You score all the way with these self-propelled machines! You keep ahead of the weather . . . handle greater acreages with less manpower, less fatigue . . . enjoy quick, easy maneuverability, finger-tip control. The operator sits on top of the work . . . sees what he's doing all the time. One man and one machine do the work of *two*. Your tractors are free for other essential power jobs.

But the heart of any self-propelled machine is the power unit. That's why leading farm-equipment builders specify Wisconsin Heavy-Duty Air-Cooled Engines . . . for dependable, all-weather, load-lugging power and low-cost maintenance . . . less downtime, more work hours.

***When you buy self-propelled equipment . . . look at the engine. Make sure it's a "WISCONSIN" and you'll be sure of "Most hp. Hours" of on-the-job service.***

Hahn self-propelled, Wisconsin-powered Hi-Boy high-clearance sprayer, applying DDT for corn-borer control. Spray can be applied at the ear zone of tall corn and in the whorl in smaller corn for most effective borer control. Made by Hahn, Inc., Evansville, Indiana.

slaughtered with *no* food except what we give it, from a sire and dam treated the same way, from grandsires and great grandsires also synthetically raised. Only when we have been without hogs which root in the brown earth for years will we know. Today it is not quality that is pushing hogs into smaller pens—it is economics.

## THE AGRICULTURAL DILEMMA

(*Continued from page* 61)

Food has been sold for foreign currencies, bartered, and in many cases actually given away in an attempt to reduce surplus government stocks. The government has spent more than a billion dollars in this area alone during the past fiscal year.

Regarding this approach the economists invited by the Farm Foundation to study the situation stated: "Subsidized domestic consumption appears to offer little hope as an aid to surplus disposal and income improvement at present income and employment levels. Any temporary price-income improvements resulting from increased consumption would be largely dissipated through the supply response from our production plant." In other words, if the demand were increased agriculture would probably step up production and again throw the whole works into imbalance.

"Subsidizing consumption abroad," the economists noted, "presents a many-horned dilemma" complicated by "a confusion of ends as well as means."

(2) Finding new uses for farm products might be another important way to increase demand. This alternative has received widespread publicity in recent years. Examples of such new uses would include making fuel out of grain, building wallboard out of cornstalks, and the like. Chemical science is constantly competing against this trend, though, through the development of replacements for agricultural commodities such as synthetic fibers for cotton and wool.

(3) Changing consumer preferences by promotion and advertising is a method of increasing demand for some products. This, too, has received increasing attention in recent years. The basic question involved is what effect can this have on aggregate consumption of agricultural commodities? The success one commodity group may have in increasing demand for its product is usually offset by a decreasing demand for some other commodity.

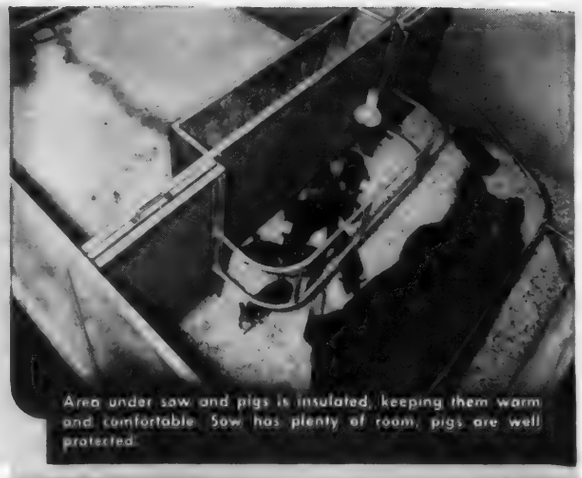
(4) Reducing market costs could change the demand for a commodity at the farm level. This is an area that historically gets farm people excited. Certainly, some important and valuable gains have and will continue to be made in this area—the Lawson plan for milk marketing, for example—but they are not enough to do much for solving the whole farm problem.

(5) A method of obtaining more income from a given demand is the practice of multiple pricing in the market. This approach tends to divide the total market into segments in which different prices can be

# CHORE·BOY

Introduces a new era in high profit pork production...the

# PORKORIUM



Area under saw and pigs is insulated, keeping them warm and comfortable. Sow has plenty of room, pigs are well protected.

## PIGS NEVER LEAVE HOME

The basic principle of the Porkorium is very simple. One pen 8 x 14 feet in size with steel walls and concrete, self-draining floor is used for farrowing, weaning and finishing each litter. When the pigs are weaned, the sow is removed and the pigs stay until ready for market. A group of two rows of 12 pens provides room for 24 sows and their litters. Pens are placed in a 32 x 96 foot specially designed, insulated, electrically ventilated building, with automatic feeding and watering equipment. With multiple farrowing, 48 sows and litters can be handled each year to produce about 400 hogs. One man can care for 4 or more such plants to produce 1600 or more hogs a year. The Porkorium is also ideal for feeder pig production, permitting farrowing of more litters per year.

## BUILT IN HOG "KNOW-HOW"

Chore•Boy and Conner-Prairie teamed up to develop the Porkorium. Chore•Boy has had many years experience in building hog and dairy systems and factory-built buildings for the Chore•Boy Herringbone Lactorium . . . a complete milk producing plant. Conner-Prairie is famous for its In-line boars and seed stock and is one of the largest establishments of its kind in the world. The combined "Know-How" of these two organizations resulted in the Porkorium.

## LESS LABOR . . . REDUCED DISEASE HAZARD . . . BETTER USE OF FEED

The Porkorium reduces labor to the minimum. Manure is quickly flushed out of the pens with high-pressure water and drains into a septic tank. Sanitary pens and isolation of litters by steel partitions reduces the disease hazard. Rate of growth is not interrupted by moving pigs to new and strange surroundings. Odors can be eliminated and flies kept under control. Pigs thrive in the Porkorium and make maximum use of feed.

## MANY NEW FEATURES

There are many new and original features in the Porkorium. The farrowing system gives the sow plenty of room for feeding and exercise. Insulated floor retains animal heat, provides comfort for pigs. At weaning time, sow and farrowing equipment are removed, giving pigs access to the entire pen. A new watering device provides fresh water at all times and eliminates possibility of contamination. Pressure ventilation provides fresh air without drafts. Insulation in the building keeps it cool in Summer, warm in Winter.

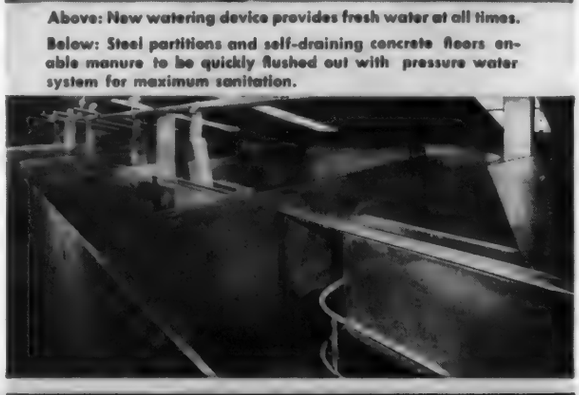
Chore•Boy will deliver the entire Porkorium to your farm, erecting it in a few days. You deal only with one organization! Extended payments are available under the Chore•Boy purchase plan.

**For a limited time only: a limited number of Porkoriums will be sold at a special introductory price!**

After weaning, farrowing equipment is quickly removed. Sow is removed and pigs stay in pen until ready for market. Pen is cleaned by high-pressure water.

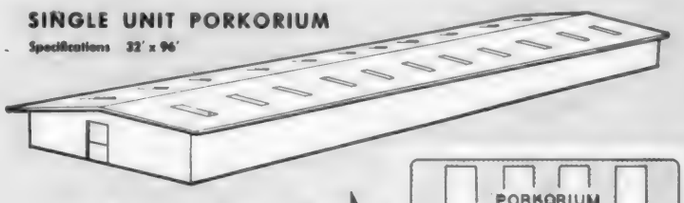
Above: New watering device provides fresh water at all times.

Below: Steel partitions and self-draining concrete floors enable manure to be quickly flushed out with pressure water system for maximum sanitation.

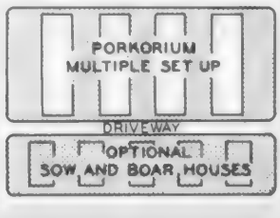


SINGLE UNIT PORKORIUM

Specifications 32' x 96'



SUGGESTED LAYOUT FOR MULTIPLE SYSTEM




A 4-UNIT PORKORIUM LAYOUT (AS SHOWN HERE) CAN PRODUCE UP TO 1600 HOGS A YEAR ... AND ONE MAN CAN EASILY HANDLE!

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CAMBRIDGE CITY, INDIANA

*Originators of the World's most Profitable Milk and Pork Production Systems!*

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# GEHL'S SHRED-ALL
# green chops
## *fast...clean...easy*

**GEHL'S POWER IDEA** . . . the Shred-All way to chop and load green feed . . . five feet of feed-maker that knuckles down to an economical payoff. The Gehl does it with a battery of swinging knives . . . short-cuts the crop and shoots it to the wagon, rifle-sure.

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charged for the given product. It is assumed here that the elasticity of the demand in the various market segments differs, and that the markets can be isolated, making it possible to increase total income. For example, we hear much about a so-called two or three-price program for wheat. This would involve one price for domestic food use, a lower price for export sales, and possibly even a lower price for the remainder of the crop to compete in the feed grain market. Perhaps the widest use has been made of this approach in the classified pricing of fluid milk under milk marketing orders. In the wheat example above, one can be pretty sure that foreign wheat growers and domestic feed grain producers would strongly resent such a three-way pricing of wheat.

### Change Supply

The demand for farm products in the aggregate is highly inelastic (that is, a reduction in price does not bring about a corresponding increase in quantity purchased; or a reduction in the quantity on the market brings about more than a corresponding increase in price) and the demand for most individual farm products is inelastic. Thus, reducing output will generally increase gross income and may increase net income substantially more than the decrease in production. The usual effort here is to restrict marketings, although the individual farmer has no particular incentive in any case to reduce production since he makes up such a small percentage of the total market. With several million producers, therefore, reductions in supply can be had only through inducements in the form of payments or eligibility for price supports, and compulsion in the form of fines and other penalties.

(1) One method of reducing market supply would be to restrict inputs. Land has been the input which we have mainly relied on through acreage limitations in the cotton, wheat, tobacco, corn and Soil Bank programs. Such a program can be successful only if there is no close substitute for land—other inputs such as fertilizer and water. In addition, if the program is successful, much of the benefits are capitalized into higher land values.

Other forms of input restrictions might include those on capital such as machinery or livestock. Another would be restrictions on purchased supplies such as fertilizer or gasoline. Curtailing fertilizer consumption or putting 100 per cent tax on fertilizer consumption would have an important effect on the production of certain crops, although it would be difficult to administer. The other factor that might be restricted, of course, would be labor. For example, licensing farmers is sometimes suggested. None of the above items have ever been seriously considered even though some would be more effective than land restrictions.

(2) Reducing the efficiency with which inputs are transformed into marketable products would be an important way to reduce supply. For example, by prohibiting the use of hybrid seed corn, the production of corn and livestock products could quickly be reduced.

(3) Another commonly discussed method of reducing market supply is by imposing direct restraints on marketing—bushel, pound and ton quotas on crops rather than acreage allotments.

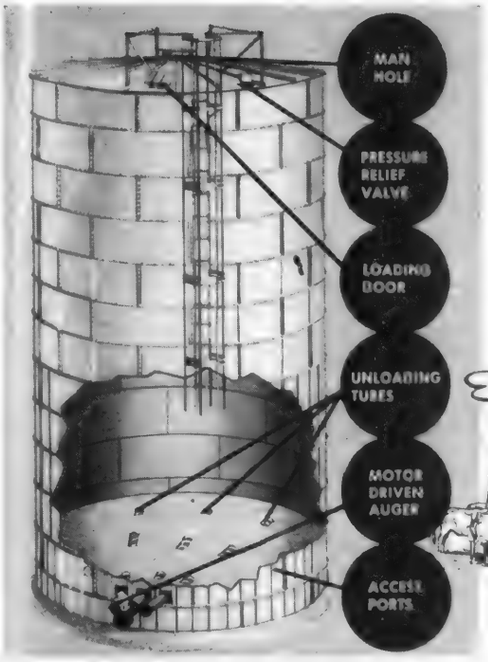
(4) Multiple pricing to the producer is another practice which would tend to reduce market supply. This approach closely parallels the multiple pricing proposal on the demand side discussed above. The price paid for commodities produced would be considerably less for above-allotment marketings than for within-allotment marketings on the farm quota.

As to these suggestions the Farm Foundation committee commented: "A supply control program probably could not stand alone; but with the necessary adjuncts, it could be made to work *if* society is willing to bear the cost and *if* farmers are willing to accept absolute production controls."

### Change the Competitive Structure

This could be accomplished either by vertical integration with industry or through horizontal combination of farms into a very small number of super-sized farms which would control production closely and limit competition.

The trend has been in this direction for years. In 1940 there were 6 million farms in the United States. By 1954 there were only 4.8 million. The average size of these farms had increased during

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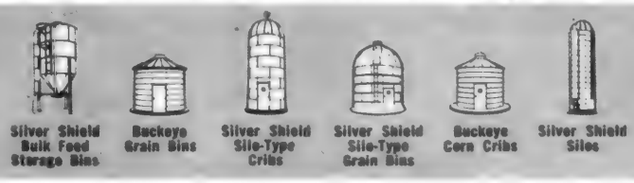
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that time from 174 to 242 acres. Averages here, of course, are rather meaningless since they make an unrealistic attempt to cut across all kinds of unrelated types of enterprises and take into account none of the geographic and climatic factors which play such an important part in farming. Still, in every branch of agriculture the number of farms is declining and farm size is growing.

Through vertical integration, all individual farms might be affiliated with one or another of the few giant processors or retailers. The price and production decisions made by these firms then would become binding upon the farmers and perhaps would be much different than in the open market today. The best example of vertical integration in agriculture at the moment — the broiler industry — gives no indication of solving the income problem. The huge production and extremely low price of broilers during the past six to eight months indicates the difficulty of such a task. Last winter some integrators were paying their producers a "subsidy" of 1½ cents per bird for not producing.

### Transfer of Income

In general this was a major part of what is popularly known as the Brannan Plan, though some versions differ widely from the ex-Secretary's. The government would actually disburse money to farmers in order to supplement their income. The payments to farmers could be based on their income rather than prices of commodities. The farmer would receive a compensatory price payment, which represents the difference between the market price and some higher intended price. This would allow all products to clear the market and go into consumption and would eliminate the disadvantage of large storage programs. Such direct transfer payment programs are now more frequently discussed as new farm legislation is considered. It seems clear that unless payments are restricted to allotment quantities, or in other ways, this kind of program can quickly be swamped by more


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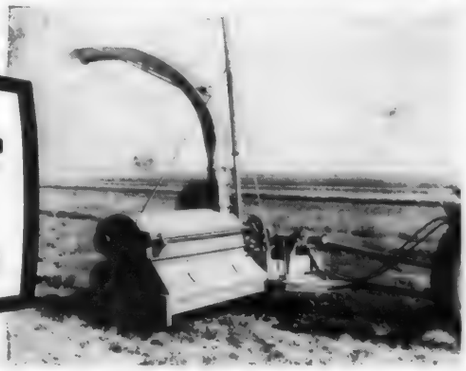

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production and rising payments.

Examples of direct income payments in government programs at the present time include the sugar and the wool programs which have been in operation for several years. These programs cannot be superimposed without modification on other agricultural segments largely because sugar and wool represent net import rather than export agricultural industries.

### Combining the Alternatives

These are the general categories from which the specific proposals for solving the farm problem can be constructed. Any final solution, if such there be, will be a combination of these general approaches. The flexible price support program, for example, is an attempt to increase consumer takings in order to simulate a free market as nearly as possible. Foreign disposal programs are a complex combination of multiple pricing and subsidies to foreign purchasers. One proposal for a wheat program would combine multiple pricing with some form of restriction of output.

We have most aggressively and extensively been exploiting certain sectors of demand expansion—especially the foreign market. Other areas of demand expansion also offer possibilities. The big and obvious one is population growth. This is fairly substantial and steady, but not nearly fast enough to absorb the surplus anytime soon.

Another is increase in income. But few Americans are starving or even undernourished, so little of increased income goes to the farmer, some goes to the processor and distributor to buy more services.

Another is advertising which now is expanding rapidly. Many economists feel it may help individual commodities—through decline of others — but not expand food consumption perceptibly.

Another is expanded industrial uses of agricultural products — plastics from soybeans, motor fuel from grain alcohol, and the like. If opportunities are available here, they are still years away as far as expanding overall demand is concerned.

American agriculture is faced with a production adjustment problem similar to the one many industries faced after the postwar backlog for orders was filled in the early 1950's. These industries reduced production to meet existing demands. There was no nonsense about increasing production to lower unit cost. Production was cut and the price was maintained and in many instances advanced.

The oil industry keeps supply under control by the number of days producers are allowed to pump. The automotive industry and the steel industry adjust production to the anticipated demand and price fluctuates within a very narrow range.

Whatever combination of approaches is used, agriculture must eventually lift a page from this same book. But with millions of independent producers, who will adjust and how?

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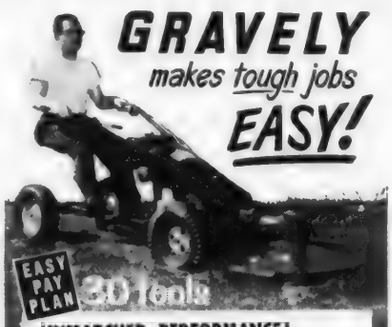


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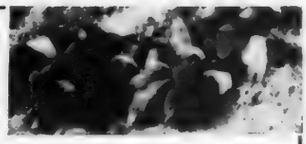

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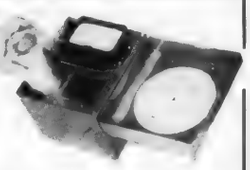

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## WINDROWS WITHOUT RAKES

(*Continued from page* 63)

ever, to depreciate the machine over 10 years may need 325 to 350 acres cut each year. Most present owners cut considerably more than that. Some, who never before did custom work, have found that the machine saves enough time at harvest for them to work on a limited custom basis in their areas. Most custom operators say they can make good money at $1.50 to $1.75 an acre when they are cutting large acreages.

But unbiased voices are rare in the states well east of the Mississippi. There, people have ignored windrowers. Farmer experiences have been isolated, specialized or unconvincing. Nobody really knows.

### Hay Made in the Shade

In sections of Utah and Idaho, the self-propelled windrower is fast becoming the basic hay machine. Much soil, particularly in the Snake River Valley, is volcanic ash, light, fluffy, abrasive. Side delivery rakes kick up clouds of dust that obscure tractors and force the operators to wear outer-space type dust masks. The dusty hay is of low quality. Self-propelled windrowers are reducing the need for dust masks. The dust-free windrows, laid on stubble several inches above the ground, can be picked up by a baler with little or no disturbance of the soil.

Frank Holmes of Arcade, New York, indicates a windrower can fit into a hay program in more humid areas. "Windrowers make darn good hay," he said, "and you don't need enormous fields to make one pay." Holmes' fields run between 11 and 15 acres. Except for some small fields of oats and wheat, his 350 acres is in long-lay birdsfoot trefoil and grass. The trefoil fields are used for seed, pasture, hay or silage. A 10-foot windrower is used in all the forage crop operations and in grain combining.

By using a haymow fan for unheated air drying, Holmes can cut and bale his legume-grass hay in one day. "It used to take us 3 or 4 days by the old mow and rake method," he said. "Hay was pretty poor stuff then, but we didn't know any better. Now the hay looks like it was cut a few hours ago. We use the windrower early in the morning and follow with the conditioner. Where the hay has been heavily rained on, I frequently run it through the conditioner twice, say at 11 a.m. and again at 1 p.m. By 4 o'clock it is ready to bale. I put it up pretty wet, but the barn fan takes care of that. The most we ever put up in one day was 1900 bales, but we milked 55 cows, too.

"The windrows shed water well. When they are properly laid, a rabbit could run down the tunnel inside them. When making silage, I don't make a criss-cross windrow, because I want the forage to stay wet so it packs better in the silo. We let it wilt slightly, and by a slow, steady pace, our field chopper can handle the windrow cut by the 10-foot sickle. You can put up a lot of silage quick."

C. E. Arnold, manager of the Arco De-

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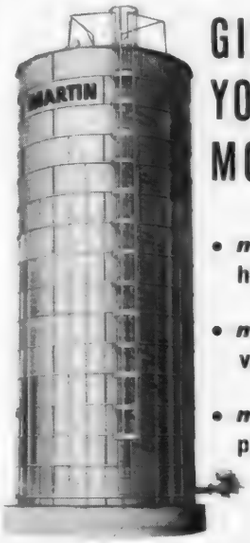


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hydrating Company at Lake Park, Iowa, has stepped up alfalfa meal production and slashed repair bills by use of a windrower. "We used to chop the alfalfa by direct cut with an 8-foot chopper," he said. "Now we use a 12-foot windrower just ahead of the 8-foot chopper. We can produce 5 to 8 tons more of dehydrated meal per day, or about 500 tons extra a year. We operate in rocky ground, and knife breakage from rocks picked up by the choppers was serious. The windrower, which rejects rocks, saves us about $2,000 a year in repairs."

Grass and legume seed producers are rapidly taking to self-propelled windrowers. Rye grass seed producers in the Williamette Valley of Oregon and trefoil seed growers in New England are finding one man with a 12 or 14-foot swather or windrower can cut and windrow 60 or more acres of seed crops in an 8-hour day. Robert S. Kennedy, an alfalfa seed producer near Sheridan, Wyoming, cut 700 acres last season with his windrower at a total maintenance cost of $10.

A. C. Claasen of Potwin, Kansas, on occasion, cuts sweetclover at night when the dew is on, to prevent shattering of seed. His windrower (he calls it a swather) is equipped with lights. "A self-propelled swather is fully as maneuverable as a crawler tractor," he said. "Each wheel is driven separately, so by putting one lever in forward and the other in reverse, you can turn on a dime. Corners are really square and no sweetclover is lost on the turns. The cutter bar lifts to almost 30 inches, which is none too high in tall sweetclover. It's easy to drive through narrow gates. By coming in at an angle, you can work through a gate opening somewhat narrower than the swather itself.

"It's hard to believe how well a swather works in down grain. We won't easily forget the wet harvest of 1957. Our oats and barley were flat on the ground. A tall, heavy growth of weeds came up through the grain. The fields were too soft for any equipment. However, we could get into the fields with the swather long before we could with a self-propelled combine. The swather put the tangled, lodged grain and weeds into a neat windrow that dried fast. Most of the grain was salvaged, as against a 50 per cent loss where the grain was combined direct after the fields had dried.

"I've found only one thing wrong with the windrower. My three boys are always arguing to see who gets to drive it. It sure handles nicely. The hydraulic lift on the header works right now. The main thing you have to learn is to keep the material flowing evenly off the cutter bar by working the reel up and down with the height of the crop. When my father used to run an old binder, he used to say you make your bundle on the platform, not on the deck. It's the same with a windrower. The way you handle the reel makes or breaks the windrow."

Lyle Pankratz and Leo Schultz, neighbors near Lake Norden, South Dakota, each farm about 500 acres, mostly small grain and alfalfa. Each of them owns a 14-foot windrower. Pankratz also does some custom work. Two years ago he cut 100 acres of oats in one long day in three fields, with 3 to 5 miles of road travel. His windrower shows no great wear after 5 seasons cutting as high as 2800 acres a season. He has never sharpened a sickle. He replaces them; and has used 4 sickles in 5 years. Pankratz said, "Never rake your hay after it is windrowed. Don't turn it no matter how many times it is rained on. Let it lay. Season before last, I broke my baler. A second cutting of alfalfa laid in the windrow 4 weeks and the third crop grew up through it to 10 inches. I eventually baled it by pulling it up through the standing crop. It was green underneath and I never lost a leaf, though the windrows were black on top.

"Last year I had sunflowers 8 to 10 feet high in my soybeans. But I cut them, above the beans, at 32 inches, as high as the header of the windrower would go, and laid the windrow between two soybeans rows. I set the castor wheel of the windrower to mash windrowed sunflowers. Later, I cut and windrowed the soybeans high and combined them without picking up weeds."

Both sunflowers and thistles plague his neighbor, Leo Schultz, who said, "The windrowers come with a field sprayer attachment, so I mount the sprayer boom right under the seat so I can see what I'm doing. When I'm spraying a grain field for sunflowers, I can save money by spraying heavier only where it's needed.

When I spot thistles, I drench 'em.

"Windrowers have changed soybean harvest around here. We used to change our combines from a pickup header for small grains to direct cut header for soybeans. Now we don't need direct cut headers. With a windrower you cut the beans about two weeks before maturity, with very little shattering. You don't wait for a frost and for the leaves to drop as with direct combining. Usually, 3 to 5 rows are cut with the windrow laid on the stubble of the middle row. When soybeans are left standing to ripen, the vines shrink and the best beans drop so close to the ground you have to scoop dirt to get them. Then you pick up rocks and dirt that ruin combine sickles, canvases, cylinders and bearings and you still lose lots of beans. Windrowing early eliminates that.

"I don't think the price of a windrower is out of line. It replaces two mowers and two rakes, which add up to about $2200."

In the Chino Valley of California, windrowers have spurted to the fore in green chop operations. Pat Vernola, who has a 1600-acre spread near Ontario, California, was the first to own one in his area. By last year, the number of windrowers had jumped to 21. Vernola bought his first model four years ago. "It was fine for grain farming," he said, "but it was built too light for heavy, wet alfalfa. The sickle and guards and canvases gave lots of trouble. Since then, the manufacturers


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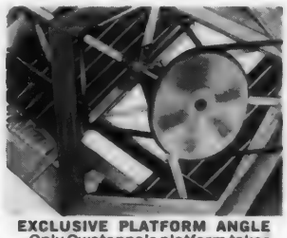

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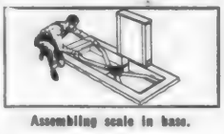
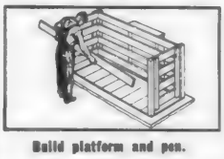


Assembling scale in base.



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have learned how to make a hay machine. The model I now have is a rugged, wonderful tool. My labor costs have gone way down. With a 14-foot cut, one man can do as much as 4 men on 4 tractors, 2 with rakes and 2 with mowers. We cut all our 300 acres of irrigated alfalfa as green chop and sell it to dairymen. That's a common practice here. The alfalfa is windrowed by a farmer, then custom haulers with choppers blow it into feeder wagons for dairy operators. Now, dairymen are demanding chop produced by windrowers. Our soil is sandy and raking gets a lot of sand into the wet forage. The knives on the field choppers last a lot longer when sand-free chop is handled."

The wide-cutting windrower is cutting its way into modern farming.

## LINNAEUS

(*Continued from page* 64)

Though Carl was definitely intended for the ministry, Nils Ingamarsson encouraged him to study what was written about plants. This he did with great intensity. He read and reread Aristotle's *Historia Animalium,* which his father gave him, even noting on the cover the immense fee Aristotle had received from Alexander for his work in natural history. His other studies, Latin, Greek, theology, however, he tackled with so little energy it took an extra year to prepare him for the *gymnasium,* and his four years in this upper school were passed without distinction. As a matter of fact, one of his first instructors, Gabriel Hook, suggested he be apprenticed to a tailor or a cobbler rather than trained for the church.

Though he had no intention of becoming a cobbler, Linnaeus found the more he studied the more determined he became not to become a minister.

After much earnest discussion and a talk with Dr. J. S. Rothman, who had greatly influenced Carl at school, the father agreed. But it was a year before he had the courage to tell his wife. To protect herself against another such disappointment, she would not let her younger son, Samuel, take any interest in the family garden.

In 1727, Linnaeus set out for the University at Lund. Lund had been chosen because a distant but wealthy relative, Canon Bonde Humerus, was there and it was hoped he would help the boy through the University. He arrived at Lund in time to see the funeral procession of the good and wealthy Canon proceeding to the cemetery. Linnaeus secured lodging in the home of the University's noted naturalist and doctor, Kilian Stobaeus, a one-eyed, crabbed man with a shrunken foot, suffering from migraine and hypochondria. Linnaeus was not a welcome guest.

He soon discovered the wonders of Stobaeus' library by stealing books, one at a time, and reading them far into the night. Stobaeus' mother, seeing the candle burning late in Linnaeus' room, told her son about the new lodger's carelessness. Late

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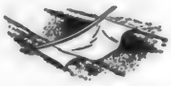
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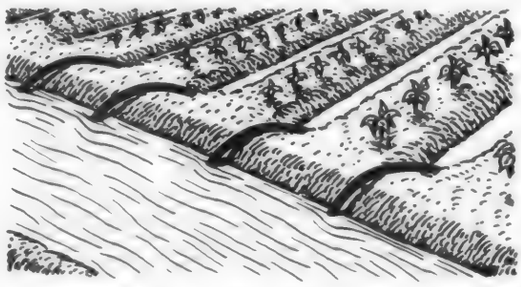

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the next night Stobaeus hobbled down the hall and burst in on Linnaeus. The old man was touched to find Linnaeus surreptitiously studying the books he loved so well. For the rest of that year, he took the lad under his care as an adopted son, gave him the free use of his library, fed him without charge at his table, allowed him to treat his patients, and above all encouraged him in the study of nature. He urged Carl to continue the collection of plants which Linnaeus had gathered.

The next year, with the equivalent of 37 dollars in his pocket, Linnaeus left the home of the ailing Stobaeus and went to Sweden's first and greatest University, Uppsala, to study medicine. The entire medical faculty at Uppsala at this time consisted of Olof Rudbeck, the brilliant son of the great naturalist, who, unfortunately, had given up teaching to work on philology, and Lars Roberg, who at 65 no longer had the strength or enthusiasm to carry on his work adequately. The University hospital was in such a state of disrepair that it was unsafe for patients. They had but one lecture in anatomy. A woman prisoner in Stockholm was to be hanged and her execution was delayed until after the Christmas holidays to give the students a chance to come to the Capitol and examine the body after the hanging.

Linnaeus worked in the University Library and spent as much time as he could in the once-great botanic gardens—now reduced to some 200 plants. And daily his meager funds melted. He calked his broken shoes with paper and tightened his belt; but the awful truth was he didn't have enough money to see him through even his first year.

Sitting in the Uppsala garden one day, Linnaeus was approached by an old man who was surprised to find a student actually describing a plant from nature. They began to talk about botany and the older man invited the student to his home. It was only when he reached the house Linnaeus realized his friend was Dean Olof Celsius.

The intelligence and enthusiasm of the young student charmed the old scholar and Linnaeus was invited to take his meals and later to move into a room at Celsius' home.

Though Linnaeus never heard a formal lecture on botany during his student days, the help and encouragement of such a man as Celsius was worth many tedious lectures. He had to teach himself and he had to turn to nature as the great source.

On New Year's Day, Linnaeus presented Dean Celsius with a paper entitled, "Preliminaries on the Marriage of Plants."

It was more than favorably received. Celsius read it with joy and passed it on to others. Students made handwritten copies of it and discussed at length the idea that the stamen of the plants could be likened to the bridegroom and the pistil to the bride. Though farmers in Africa as far back as history records, had been fertilizing the flowers of the female date palm with the pollen of the male, the concept of the sexual nature of the parts of the plant

was novel indeed to Uppsala and, indeed, to most botanists.

Not many years earlier, the great naturalist Malpighi had suggested that the function of the stamen was to purify the sap that went to nourish the seed. The English scientist Hales believed that the stamen exuded sulphur which unites with air and light "and these three, by far the most active principles in nature, enter and invigorate the plant."

These writings were unknown to Linnaeus at the time, but they serve to show the general searching going on in the minds of the botanists. He *had* read Sebastien Vaillant's suggestion as to the true nature of the pistil and stamen of the plant and had examined every plant he had collected around his old home at Stenbrohult, at Lund, and around Uppsala. He had even become aware that though the color and even the number of petals might differ within a species of plant, the number of stamen and the nature of the pistil remained constant.

The success of Linnaeus' New Year's paper influenced his whole career. Olof Rudbeck saw a copy of it and immediately came to Celsius' home to meet the young author. Rudbeck, who even more than Celsius, was interested in botany, soon had Linnaeus installed in his own home and smoothed his financial way by paying him to tutor the four youngest of his twenty-four children.

Rudbeck had turned from botany to philology, but he talked to Linnaeus of the one exciting expedition of his life, the trip to Lapland in 1695 during which he described and had drawings made of the strange northern plants. Rudbeck could still tell the story with enormous appeal. It is not surprising that soon the two were planning a similar trip for Linnaeus.

On a bright spring day in May, 1732, when Linnaeus was within a day of being 25 years old, he rode out of Uppsala, trotted his horse past the three great mounds believed to be the burial places of the Norse Gods Odin, Frigga, and Thor, passed through the small island of farming country surrounding the town, and plunged into the forest. He was an expedition of one on his way to Lapland.

His equipment for this journey, he wrote in his diary, consisted of: "a light coat of linsey-woolsey cloth without folds, lined with red shalloon, having small cuffs and collar of shag; leather

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breeches; a round wig; a green leather cap, and a pair of half-boots. I carried a small leather bag, half an ell in length, but somewhat less in breadth, furnished on one side with hooks and eyes, so that it would be opened and shut at pleasure. This bag contained one shirt; two pair of false sleeves; two half shirts; an inkstand, pencase, a microscope, and spying-glass; a gauze cap to protect me occasionally from the gnats, a comb; my journal, and a parcel of paper stitched together for drying plants." His finances consisted of 400 copper dalers (around $50) given him by the Royal Academy of Science—a meager amount for a 4000-mile journey.

For five months Linnaeus rode, trading horses where he could, and walked almost a thousand miles of his journey through the swamps, the forests, and the mountains of the land of the midnight sun. And everywhere he saw and collected and described plants which no other botanist had ever seen. In Norway he listed the plants which were suitable for pasture and forage and at Tornea he warned the farmers of the water hemlock which was not. He went weeks without bread or salt, ate fish and reindeer milk, berries, and at one time the breast of a woodcock which had been killed the year before and buried for future use—this high meat he found good. He collected and described the birds, the insects which made his life miserable, the lemmings, reindeer, and other animals. And throughout, he thought and planned and made notes on a system by which he could classify and identify nature.

When winter closed in, Linnaeus returned in triumph to Uppsala. During the next two years, he lectured on mineralogy and assaying and on dietetics—a subject which hunger had taught him—and continued his writing. During these two years he made two short scientific trips on one of which he met Sara Lisa Morea, the daughter of a well-to-do doctor. They were engaged on condition Linnaeus secure his degree of doctor of medicine.

A new period of Linnaeus' life opened when he boarded the miserable sailing vessel, "The Travelling Tobias," and set out for Holland to get his doctor's degree. In the three years he was to stay abroad, he was to achieve his world-wide reputation.

He arrived at the University of Harderwijk where, within a period of seven days he entered the university, presented his thesis, "New hypothesis as to the Cause of Intermittent Fevers," completed his examinations and received his degree of Doctor of Medicine. Having obtained his objective, he decided to spend a few days visiting scientists at Holland with whom he could communicate in Latin—the only language he knew other than Greek and his own.

The intelligence and charm of this short, athletic Swede with his large head and sharp brown eyes had its effect. He soon acquired patrons—the distinguished Dr. Jan Fredrick Gronovius and the learned Scot Isaac Lawson, who published at their own expense Linnaeus' revolutionary *Systema Naturae* in which he categorized all of nature according to his own system. He was taken up by Herman Boerhaave, greatest of all European scientists of his time. And he was employed by the vastly wealthy Georg Clifford, Director of the Dutch East India Company, as his physician and overseer of his botanic garden.

With the financial and personal backing of these great men, Linnaeus blossomed. In rapid succession over the three-year period he published his great works *Bibliotheca botanica, Fundamenta botanica, Genera Plantarum, Flora Lapponica, Critica botanica, Hortus Cliffortianus,* and in addition, edited and published his friend Peter Artedi's *Ichthyologia.*

In these works, Linnaeus divided the natural world into the animal kingdom, the vegetable kingdom, and the mineral kingdom. He subdivided his kingdom into five branches, each subordinate to the one above; class, order, genus, species, and variety. He also developed the binomial system of naming; doing away with the cumbersome descriptive names, wiping out the confusion of many names for the same object, and supplying to each a name composed of its generic name taken from the genera into which it had been classified and its specific name from the species to which it belonged. He likened the binomial system to the names man has adopted—a given name to identify the individual within the family, and a family or surname. Thus Carolus Linnaeus is known as a member of the Linnaeus family and is distinguished by the name Carolus from his brother Samuel.

In making his divisions of plants into their classes and orders he went back to his studies of the sexual nature of the stamen and pistils. He put into the same class all plants with a single stamen and a pistil, or as he put it, one husband in marriage; and into other classes those plants having two, three, four husbands and so on. He divided those with some tall and some short stamens and the number of each, and he further divided according to the nature of the pistil.

He freely admitted that his system was an artificial one. "In this arrangement the classes and orders are arbitrary; the genera and the species are natural." In defending this method, he said, "The artificial system is only for diagnostic purposes, but the natural (division of plants) I cannot accomplish even if I should spend my entire life on it. I cannot separate the natural families." Goethe, the German poet and philosopher, sympathized with him, "Natural system," he said, "is a contradictory term. Nature has no system."

Since then, we have devised more natural classifications of plant and animals based, in part, on their evolutionary development. In classifying and naming the common kidneybean, for example, Linnaeus placed it in *Diadelphia,* or two brotherhoods of husbands; order *Decandria,* with ten husbands; genus, *Phaseolus,* which he took from Greek; and species name, *vulgaris,* to show it was the common variety. The binomial name, *Phaseolus vul-*


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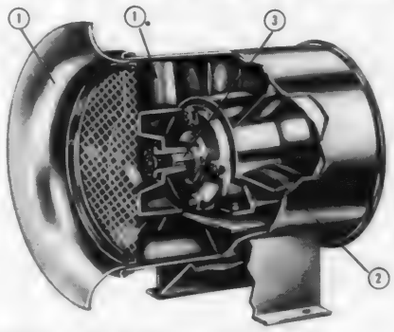


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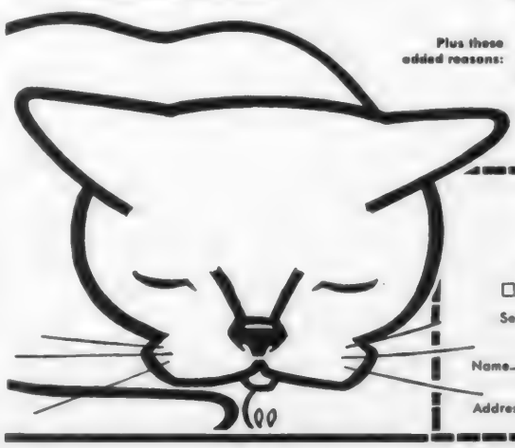

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*garis,* replaced all of the older names such as *Phaseolus Carina cum Staminibus Styloque Spiraliter tortes,* which translated means: Phaseolus with keel with stamens and style spirally twisted. Today, botanists still use the Linnaean name *Phaseolus vulgaris* for the kidney bean, but they have discovered the relationship between all legumes and have put it into *Leguminosae.*

But at the time Linnaeus was writing his first great works in Holland, he had no inkling of evolution. "Species," he said, "are as many as the Supreme Being produced diverse forms at the beginning, which forms by following the ordained laws of generation produce more but always like themselves." Believing as he did that the species had remained constant since the Creation, he failed to recognize any larger relationship than the obvious one between genera and species. His sexual classification was simply a convenient and accurate tool to be used in identifying a plant.

Though Linnaeus' writings were the main weapon used against the theory of evolution and though the evolutionists denounced him bitterly, they could have used his later writings with great effect if they had bothered to read them carefully. In later life he saw so many signs of change, development, and interrelationship, that he began to theorize that in the beginning the Creator made but one vegetable of every natural order and that crossing had created the multitude of genera and species. And, after he, himself, had seen natural hybrids and had artificially created fertile hybrid crosses he wrote, "Every sagacious botanist is admonished that from now on he should very carefully study the origin of species and undertake experiments as to whether they cannot be produced by art or by chance."

The sudden publication of these early works which had been in preparation since his student days, made a great scientific splash. He was hailed by the leading scientists as one of the great. He was also attacked. The Russian J. G. Siegesbeck denounced his sexual system because, "God would never have allowed such odious vice as that several males should possess one wife in common. Such an unchaste system should not be taught to our youth."

In 1738, Linnaeus returned to Sweden and began practicing medicine in Stockholm. The following year, when he was 32, he married his Sara Lisa. Though his medical practice became so great that he hardly found time to count his fees, he longed to get back to his beloved botany. He was overjoyed when, in 1741, he was appointed Professor of Medicine and Botany at the University of Uppsala.

During the 37 years that remained to him—more than half his lifetime—Linnaeus lived a fruitful and active life. He developed and matured his methods of classification and his binomial system of naming. He delved more deeply into nature, discovering for example, the function of the bee in pollinating plants. He experimented with the castration of plants

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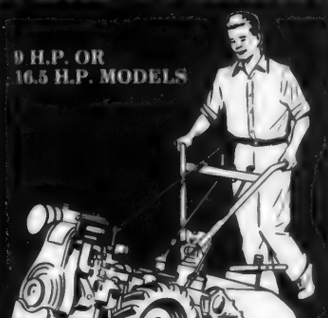

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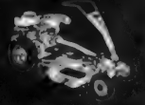

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by the removal of the anthers and discovered that by cross-pollinizing he could create a hybrid. He made excursions into other fields of science propounding a theory that many diseases are caused by microscopic animalcules; discovering that the whale is a mammal rather than fish; inventing a method by which fresh-water muscles could be made to produce pearls.

His fame brought students flocking to Uppsala from all over the world. They left Uppsala to spread Linnaeus' fame and to carry on his work; men like the Englishman Solander who traveled with Captain Cook around the world collecting strange plants from the Sandwich Islands, Tahiti, and Australia; men like Per Kalm who toured North America sending back specimens through the scientifically-minded postmaster of Philadelphia, Benjamin Franklin; men like Carl Thunberg who traveled over Africa and the Far East and became known as the Linnaeus of Japan. And all of them, while they lived, continued to send reports, descriptions, and specimens back to Uppsala where Linnaeus classified, catalogued, and named. He even classified botanists into botanists and flower lovers.

Honors came to him. He was knighted and given a patent of nobility—changing his name to Carl von Linne. The King of Spain made a flattering and lucrative and futile offer to come live and teach in Madrid. He was elected to the foremost scientific bodies of his day and his correspondence was enormous.

Not all his life, unfortunately, was sweetness and light. The fair Sara Lisa grew into a rough, domineering wife whose major intellectual achievement was a sharp card sense. Linnaeus became a henpecked husband who during part of his life found peace by the simple expedient of sleeping during the day and working at night while Sara Lisa snored and his pet cricket chirped. But his love of botany sustained him and his enormous production of new works and new editions of his earlier works continued. The ten-page *Systema Naturae*, for example, went through 17 editions and grew to a huge volume of 2,500 pages.

Then, as to all, old age came to Linnaeus. A stroke, which he called his first messenger of death, left him partially paralyzed. He wrote of himself, "Linne limps, can hardly walk, talks confusedly, can scarcely write." Though he had to wait four painful years for death's final messenger, the end came on January 10, 1778.

Though he could be modest, as when he adopted the plant *Linnaea Borealis* which appears in almost all paintings of him and described it as "A plant in Lapland, of short growth, insignificant, overlooked, flowering only a very short time; the plant called after Linnaeus, who resembles it," he also knew his worth. In the end, the world came to agree with his evaluation of his own work, "He who sees what botany was before my time, and what it now is, would hardly recognize it; I have changed all and have been the greatest reformer in that science that ever existed."

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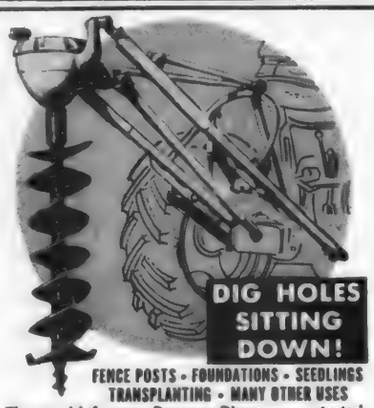

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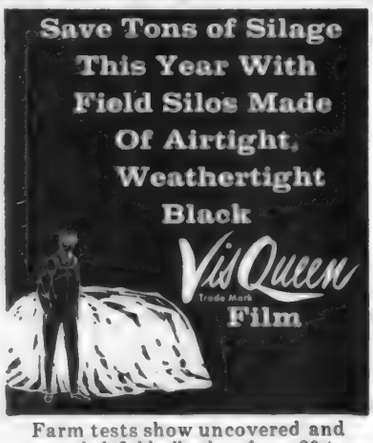


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## JIM, THE WONDER DOG OF SEDALIA

(*Continued from page* 69)

when he was just a few weeks old was given to Van Arsdale. While his brothers and sisters were valued at $25.00, a good price for a dog in those days, Jim was offered for $5.00 because, as his new master said, he was an ungodly looking dog.

Van Arsdale kept a large string of setters for hunting quail. The keeper of the kennels was Ira Irvine, who trained the dogs, and turned them over to Van Arsdale when ready for field work.

Jim was either too lazy or too smart to go to school. While Ira was working the other pups in the field, Jim sought the shade, and watched the proceedings. Van Arsdale became discouraged with the dog and offered to give him away. "I wouldn't do that, Mr. Sam," said Ira. "He's the smartest dog I ever saw. Take him out alone and see what he will do."

Van Arsdale did take him out alone, and on his first hunt Jim pointed a covey of quail perfectly and followed through to point the singles after the covey was scattered. He brought the dead birds to his master without mutilating them.

Until the incident of the trees, Jim had been used solely as a hunting dog and lived in the kennels with Van Arsdale's hunters. Now he was taken into the Van Arsdale home, and until the dog's death at 12 years, he and his master were rarely separated.

A favorite stunt was to identify cars which Jim did both by make and license number. Jim's talents seemed to have no limit. A hotel guest, J. Wilbur Cook, of the F. A. Owen Publishing Company, found a kitten in the street, and brought it to the hotel where is was given a home. On his following visit he was informed that the kitten, now grown, was expecting. "I wonder if Jim can tell us how many kittens there will be?" he asked Van Arsdale. Jim was called, and as always he sat down on the left of his master and looked up at him. "Jim, here are some pieces of paper on the floor. Show us how many kittens our cat will have." Jim pulled out five pieces of paper. "Now tell us what sex they will be."

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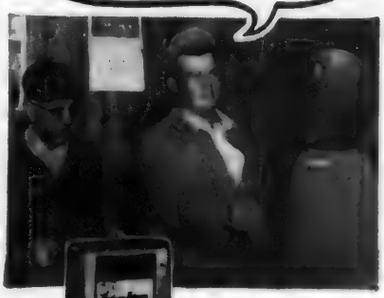

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Ten pieces of paper, five with the word female and five with male written on them, were put down. Jim pulled out three female and two male. A few weeks later the cat gave birth to three females and two males.

Having established a reputation, Jim was greatly in demand to predict the sex of babies. One visitor to the Van Arsdale home, Judge J. V. Kesterson, was about to become a grandfather. Jim repeatedly predicted it was to be a boy, and a boy it was.

During the following months Jim correctly predicted the sex of five babies. At this point Mr. Van Arsdale threw in the sponge. "Jim and I have more to do than predict sex," he said, and went hunting.

Learned men, doctors and scientists, were curious about Jim and many attempts were made to fathom his mysterious powers. On the invitation of a group of the faculty of the University of Missouri, Jim was taken to Columbia for an examination and demonstration. A Paramount News crew was on the scene to record the tests, which were made in the open air on a tennis court. Hundreds of students and faculty saw Jim follow every request made. Dr. A. J. Durant, Dean Emeritus of the School of Veterinary Medicine at the University, recently described this demonstration.

"I had never seen the dog nor did I know Mr. Van Arsdale, but I had heard a great deal. I was skeptical and I watched very carefully for some cue or sign Mr. Van Arsdale might give the dog. My doubts on that score were soon dispelled. Questions were asked the dog whose answers Mr. Van Arsdale did not know. For example, there was a professor in the audience who was known as 'Piggy' to his students. Mr. Van Arsdale certainly did not know this, yet Jim searched him out in the crowd. To the question, 'Can Jim read?', Mr. Van Arsdale's answer was that Jim had read messages and could identify every letter of the alphabet. On request, Jim pointed out the letter 'O' in the word Paramount on the sound truck. A professor wrote a message in the Greek alphabet. 'Read this Jim', said Van Arsdale, 'and do what it says.' Everybody thought that at last Jim was stumped, for he made no movement from his master's side. However, the professor at once confessed that he had merely written out a portion of the Greek alphabet. Later Jim read messages in French, German, Spanish, and shorthand.

"Jim was asked to point out a man wearing a blue shirt and a red tie. 'Now they've


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caught him', I thought. Knowing a dog is color blind, I was sure that Jim could not identify the man. However, he had no trouble at all. Apparently it was not necessary for him to distinguish a color. All he needed to know was the man—and that he knew, how I don't know.

"We were all baffled and it just didn't occur to us to go further than we did at the time. Later I attempted to get a group from the psychology department to go to Sedalia, but they were not interested."

One of the most controversial aspects of Jim the Wonder Dog was his reputed ability to predict the future. Jim's prognastications were the least documented of his feats, but we must take the word of many intelligent and responsible people that he did make infallible predictions.

It was the custom of Mr. Van Arsdale and a group of his cronies to gather each evening in the lobby of the Sedalia Hotel for small talk and cigars. In one of the sessions the coming Kentucky Derby was discussed. One of the party asked, "Do you suppose Jim could tell us the winner?" Mrs. Van Arsdale tells the story: "Mr. Van Arsdale wrote the names of the entries on separate pieces of paper and gave one to each man. They were folded and no one knew what was on his slip. Then he said to Jim, 'Jim, I want you to pick out the man who holds the winner of the Derby.' Jim placed his paw on the knee of one of the men. Mr. Van Arsdale put the slip in an envelope and gave it to a banker friend in the group who locked it in the bank safe. When the Derby was run the envelope was brought out. It contained the winner.

"For seven straight years Jim picked the winner. But Mr. Van Arsdale never allowed anybody to see the sealed selection until after the radio announced the results. He was very much afraid that something evil might happen—that it would be dangerous to have bad men know that Jim could do this."

Jim correctly predicted that Roosevelt would win over Landon, and someone remarked in a newspaper editorial that the *Literary Digest* would do well to hire


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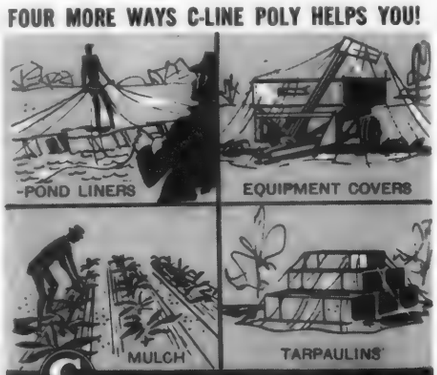


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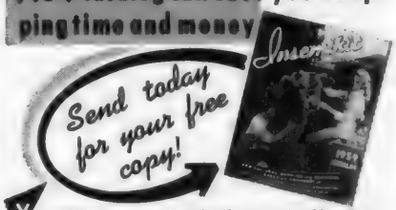


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Jim. Picking the World Series winner was a routine job for Jim.

Van Arsdale received a number of offers from sportsmen who saw in the dog a much more reliable tipster than any tout. Opportunities to capitalize on Jim's talents came from many sources. An offer in six figures to sign a Hollywood contract, and an engagement at the Century of Progress Fair in Chicago, were turned down by Van Arsdale. Dr. Durant said of him, "He never made a cent off Jim. He resolutely refused to commercialize him."

While Jim was an obedient and well-mannered dog, with one exception he was not responsive to any person other than his master. The exception was Dr. J. C. Flynn of Kansas City, Missouri. Dr. Flynn was president of the National Veterinary Association, a distinguished veterinary surgeon. Jim was sent to Dr. Flynn's hospital in Kansas City for treatment during an attack of rheumatism when he was eight years old.

Jim spent the first few days of his illness at the hospital, but was then taken to Dr. Flynn's home. It was during this time that the veterinarian discovered, quite by accident, that Jim would "perform" for him as he did for his master.

"Jim seemed to be unhappy at the hospital," Dr. Flynn reported later, "and one evening I took him home. When he got out of the car at my home I said to him, 'My little niece is in the northwest room. Go on up and see how she is while I put the car away.' This request was entirely unconscious and I had no intention of testing Jim. I always talk to animals and when I opened the door for Jim I said it more to assure him. When I put the car away and went into the house I found Jim sitting by my niece's crib with his paw on the pillow. To find the room he had to go up a flight of stairs, down a long hall, and make a choice of several rooms."

Thereafter, Dr. Flynn gave him every test he could think of in an effort to discover the secret of his power. "The most amazing thing about Jim was that he never failed," Dr. Flynn continued. "He was, like nature, infallible. I took him to a large party one evening. One of the guests was a stenographer. She wrote a number of requests in shorthand and Jim followed them perfectly."

There were few doubters among those who saw Jim perform. However, there were skeptics, those who refused to believe the unbelievable. Among the most prominent of these is Will Judy, editor of *The Dog World,* and an international authority on dogs. Mr. Judy, who never saw Jim, steadfastly refuses to believe that his gifts were anything more than a trained high intelligence, plus good guesses and coincidence. He says of *Jim the Wonder Dog,* a biography of Jim written by Clarence Dewey Mitchell, of Columbia, Missouri, "Frankly, I do not believe that the book is telling the truth. If I am to believe a great part of what is in this book I must revise entirely my whole basis of information and opinion on animal psychology."

Many people who saw Jim perform have been interviewed for this article, among them Mrs. Pearl Van Arsdale, widow of the dog's owner; Dr. A. J. Durant, professor emeritus of the College of Veterinary Medicine of the University of Missouri; Dr. Clarence Dewey Mitchell, the dog's biographer. All these are reliable and thoughtful people. We have the signed statements of many others who saw the dog and they have stated that the information given here is just as they saw it happen.

Van Arsdale did not believe telepathy could explain Jim's powers—too often he did not know the answer himself. For example, he stopped at a filling station one afternoon and the attendant, recognizing Jim, asked to have him "do a stunt." Van Arsdale was inside the station office at the time, paying for his gas. "Jim," he said, "show us where the man keeps his money when he goes home at night." He had seen a small safe in the office and fully expected Jim to walk over and place his paw on it. Instead, Jim went to a corner where there was a pile of old tires and placed his paw on the bottom one. The attendant was amazed. "I guess I'll have to find a new hiding place. That's where I hide the cash box. The safe's been robbed twice."

Among the most competent men to comment on the story of Jim the Wonder Dog is Dr. J. B. Rhine, Director of the Parapsychology Department of Duke University. One of the world's foremost authorities on the extrasensory phenomenon, Dr. Rhine says of the story of Jim: Perhaps the best service this story renders is


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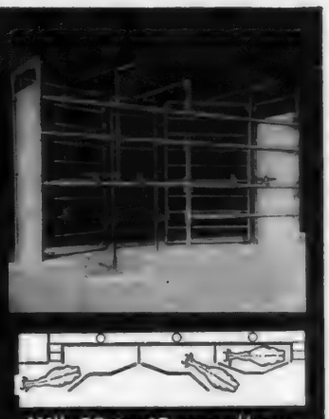

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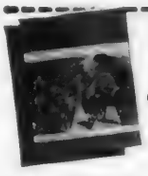

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to remind us how little we really know. There are many more mysteries in the behavior of dogs than anyone would believe who did not start putting them down, adding them up, and keeping at it for years. In the story of Jim there is perhaps more of a concentration of these mysteries than in any other dog on record. But I think we will have to assume, as we do in all the sciences, that in due time by proper study we shall find out how dogs like Jim do what they do.

"I can go only part way with Mr. Judy's opinion. I agree that we must be very cautious about accepting free accounts of an animal's doings, because animal lovers like to be generous and storytellers like to be interesting; but being careful is not the same as closing one's mind. Jim lived in a sort of goldfish bowl and there were plenty of people doubtless eager to 'explain the trick.' If pure fabrication were involved it would not have got by very long. I do not find it difficult, even for introductory scientific purposes, to accept these claims of the striking things Jim was able to do. But what they do to me is start me looking for more cases like Jim's to strengthen the case, if there is one, and to allow the study necessary to explain the doings if they occurred as reported. Such a study could be a very important one if it led to the discovery of powers of such revolutionary character and such great potential value.

"And there is one more difference I would stress, and this is with Mr. Van Arsdale himself; it is reported that he was frightened by Jim's performance or, rather, by the implications of it. But this could only have come from reading into it some theory that was not necessary. Accepting the facts is one thing, but forcing an interpretation is a very different matter.

"Many thoughtful people who know about Jim seem to be hesitant to say telepathy and other capacities for extrasensory perception could account for Jim's remarkable behavior. I have been investigating these capacities for many years and have even worked with dogs in the line of investigation. There is some fairly good experimental evidence of telepathy between man and dog, and allowing that Jim was an exceptional case, as he was, whatever the ability concerned may be, I find that telepathy is a pretty useful type of explanation of the results. Van Arsdale thought he had ruled out telepathy when he himself did not know the answer. But telepathy is not a one-party line; even in experimental demonstrations two people have acted together as senders for a single receiver. The man who knew where the money was hidden was right there in the room with Van Arsdale, and if minds start getting together, what is to keep three from working together as well as two?

"But all of this leaves me far from the conclusion that telepathy was actually in operation in Jim's performance. A sensitive hunting dog, used to working with his master and bending his whole body in the direction of his master's interest, might easily develop a great capacity for catching the most subtle cue of eye or posture. It could thus, like Jim, be guided to a tree in a woods, a person in the crowd, an automobile on the car lot.

"It is true that as the stories are told this would seem to have been very nearly impossible in some of the cases of Jim's feats, but we must remember that these are accounts by witnesses who were not trained to look for subtle signs of the type I am referring to. So I say it is better not to try to say that telepathy *did* operate in Jim's performances but, rather, that it may very well have done so and if it did, this ability, along with the dog's intelligence and his very great responsiveness to his master might explain most things reported."

Jim did not seem to think of himself as a dog. It was with difficulty that he was induced to sire a litter of pups. These pups, of which much was expected, turned out to be just plain dogs.

Jim passed away, the victim of the infirmities of old age, on March 18, 1937, age 12 years and 8 days. His body was embalmed and buried outside the gates of the Marshall, Missouri, cemetery. He took his secret with him.


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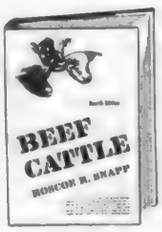


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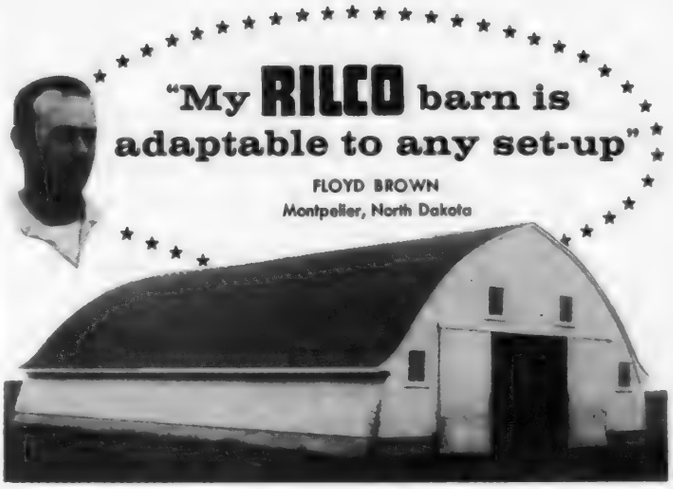


● "An open building like my Rilco barn lends itself to change. I can use a different set-up every year if I care to," says Floyd Brown. Post-free Rilco construction provides extra usable space plus complete flexibility to plan work-saving arrangements and set up mechanized materials handling systems.

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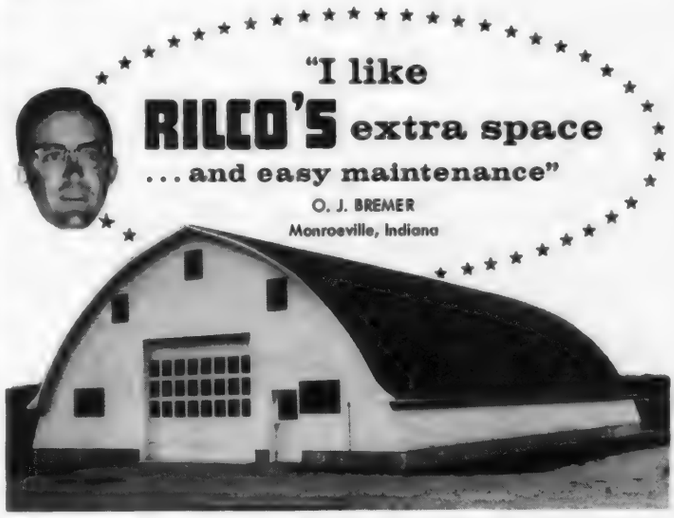


● "I built Rilco because I wanted a building that would add to the appearance and value of my farm. I like the looks of my Rilco machine shed . . . and the easy and economical maintenance," says O. J. Bremer, Monroeville, Indiana.

Mr. Bremer has made good use of the extra space his Rilco Type 50 machine shed provides. At one end of the building is a loft set on columns spaced the same width as the door opening. The loft provides extra space for light storage.

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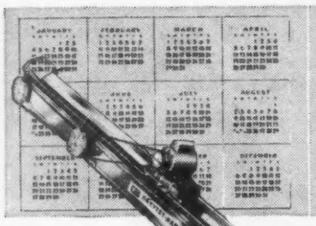

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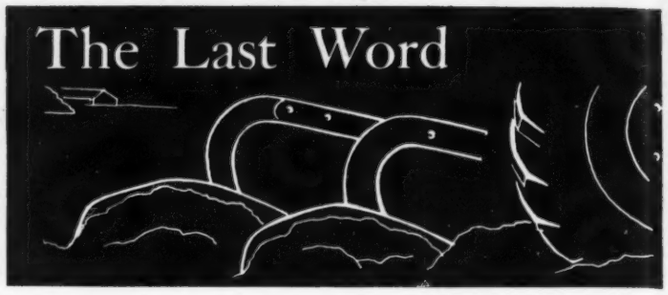
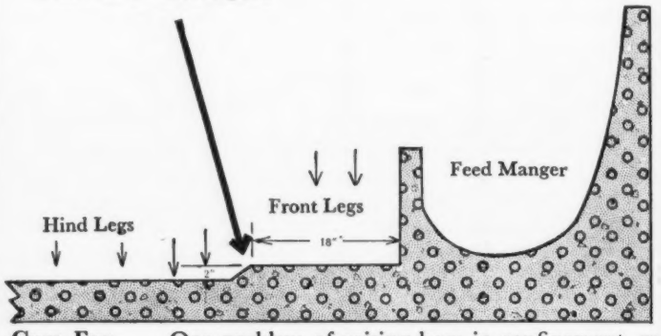



**Good Table Manners For Cattle** Well-bred cattle at the feed bunk can behave in an ill-bred fashion by turning sideways, blocking off a large section, and splattering some other steer's plate with their droppings. E. H. Davis, agricultural engineer of the University of Idaho, has a simple remedy for this bad habit. By building a narrow step next to the bunk, he makes side standing uncomfortable if not impossible. His design for the Bob McMinn Ranch at Pocatello is shown below.

Offset on Concrete Apron




**Cure For Tail Biting** One problem of raising hogs in confinement, as we mention in "The Pen: for Life" on page 71, is tail biting. Some farmers, feeling that tail biting is the result of boredom have tried curing it with hog toys such as rubber balls or old tires; others have increased feeder space; still others have docked their baby pigs, and some have thrown sod into the pens to satisfy this depraved appetite. Now, an Indiana veterinarian believes he has found a solution. The findings of Dr. Richard A. Spring are reported by Neal Black in the NATIONAL HOG FARMER.

Dr. Spring has found that tail biting results from anemia and the anemia is usually caused by one or more of three things—none of them boredom. He reached his conclusions after slaughtering and examining the carcasses of dozens of identified tail biters. In every case, he found anemia; his other findings led him to the three most common causes of this blood deficiency. The first most common cause, he found, was a streptococcus infection centered in the kidneys. Next came an iodine deficiency which caused an enlargement of the thyroid gland. And occasionally he found blood-sucking red stomach worms—usually in feeder pigs imported from the South.

In the case of streptococcus infection, he treats with sulfanilimide at the rate of one pound per 300 pounds of complete feed for five days. Iodine deficiency is corrected by feeding an organic iodide compound at the rate of one pound per 500 pounds of complete feed for five days. His cure for red stomach worms is to feed flavored phenothiazine at the rate of one pound per 100 pounds of feed for 24 hours.

## THE FARM'S PICTURES

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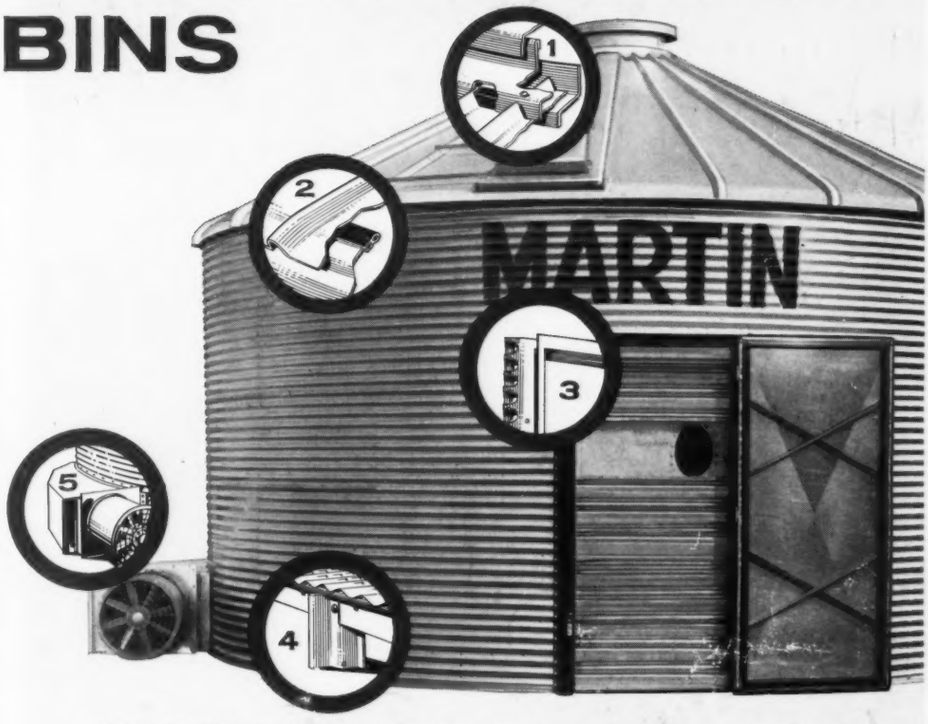
**5** **Air duct** is engineered for greatest efficiency. This transition from fan to bin floor gives the smoothest flow of drying air without forming eddies of dead air or back pressure. Fan capacity matches drying capacity for profitable results. You have a choice of supplemental heaters.

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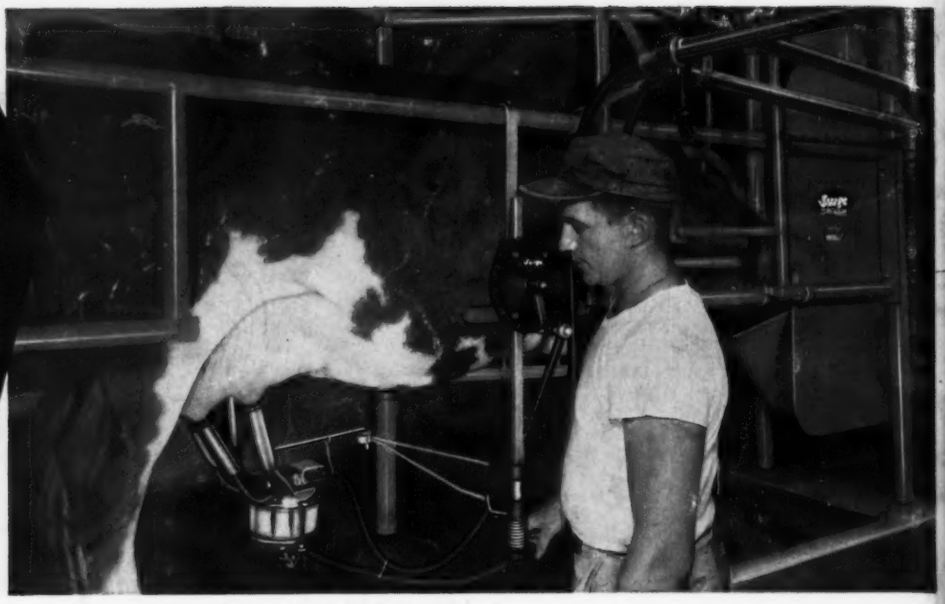

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